IMPACT OF THE MEALTIME ENVIRONMENT AND CAREGIVER FEEDING STRATEGIES ON PICKY EATING BEHAVIORS IN CHILDREN

BY

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THESIS

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ABSTRACT

Children's food preferences and eating habits are influenced by a multitude of factors, including the mealtime environment and caregiver feeding strategies. Childhood represents a critical time to establish healthy eating behaviors, because proper nutrition is needed for optimal growth and development and eating habits formed during this time tend to persist into adulthood. However, ensuring that children consume the adequate amount of nutrients is often a challenge caregivers face due the child's picky eating behavior. Picky eating (PE) is typically defined as having low dietary variety and rejecting both familiar and unfamiliar foods and has been linked to several negative outcomes. Previous literature regarding PE has largely focused on parents even though millions of children are also cared for in non-parental childcare settings such as center-based childcare (CBCC) and home-based childcare (HBCC). While it is known that the environment and the strategies that are utilized at mealtime impact child eating behavior and food preference, there is a gap in the literature addressing how differences between a child's home and childcare (i.e., CBCC or HBCC) environment and the mealtime strategies utilized in each impact child PE behavior. Therefore, the overall goal of this research was to characterize the influence of the mealtime environment and caregiver mealtime strategies on PE behaviors in children. In order to achieve this goal, there were four objectives: 1) identify differences in mealtime strategies between parents and childcare providers, 2) compare differences in caregiver perception and agreement of child pickiness and its influence on utilized mealtime strategies, 3) compare observed and reported child PE behaviors between the home and childcare environments, and 4) compare observed and reported caregiver mealtime strategies in response to child PE behavior between the home and childcare environment. Fulfillment of these objectives was achieved by observing children (n=26 from CBCC, n=24 from HBCC)

consuming lunch twice in their childcare location, once consuming the “popular” meal and once consuming the “non-popular” meal, and twice in their family home consuming the same popular/non-popular meals. After completion of observations, a codebook was created in order to capture child PE behavior and mealtime strategies utilized by caregivers. Research assistants achieved reliability of >0.90 Cohen’s Kappa on the four PE behaviors of interest: physical refusal, physical avoidance, verbal refusal, and verbal avoidance and on the five mealtime strategies: encouragements, modelling, question [about behavior or food], ignoring/no response, and other. In addition, caregivers completed the Mealtime Assessment Survey (MAS), which assessed the child’s typical mealtime behavior, and the Parent or Teacher Mealtime Survey (PMS/TMS), which assessed the typical strategies they utilized at mealtime. Results for the first objective showed that overall, parents and childcare providers utilize different strategies at mealtime, especially CBCC parents and providers. In almost all cases, parents were more likely than childcare providers to report utilizing the strategies. Surprisingly, we also found differences in mealtime strategies between parents who elect to send their child to CBCC versus HBCC. These findings led to objective 2. From this study we found that parents were more likely than childcare providers to perceive a child as a PE, and that their perception of child pickiness had a greater influence in the mealtime strategies that they utilized than childcare providers. Additionally, we found that between HBCC and CBCC parents and providers, HBCC caregivers agreed more with one another in their perception of child pickiness and were more likely to perceive a child as being picky than CBCC caregivers. The results from objective 2 led us to believe that children could be behaving differently at mealtime between their home and childcare locations. Therefore, for objective 3 we compared observed and reported child PE behaviors between the home and childcare environments. We found that overall, children were observed to

be pickier eaters at home, even when controlling for the food. Significant correlations between reported and observed mealtime behaviors were found for some, but not all caregivers. Lastly, we were interested in comparing observed and reported caregiver mealtime strategies in response to child PE behavior between the home and childcare environment. Results from this study revealed that parents were more likely than childcare providers to respond to a child's picky eating behavior. We also found that overall both parents and childcare providers reported using all strategies significantly more than we observed them using, with the exception of ignoring/no response. The collective findings from this research defined for the first time how differences in the mealtime environment (home vs. CBCC or HBCC) and caregiver feeding strategies impact PE behavior in children. These findings can be used for future intervention studies that focus on helping caregivers raise healthy, independent eaters.

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CHAPTER 1
Introduction

1.1 Motivation for the Research

Proper nutrition during childhood is imperative for optimal growth and development (Birch, 1998). In addition, the eating habits and food preferences that are established during childhood tend to persist into adulthood (Schwartz et al., 2011). Both of these factors highlight the importance of, and opportunities that, childhood has on the establishment of healthy eating habits. However, establishing healthy eating habits and ensuring that children consume the appropriate amount of recommended foods can sometimes be a challenge to caregivers due to the child's picky eating behavior (Cathey & Gaylord, 2004).

Typically, picky eating is defined as having low dietary variety and rejecting both familiar and unfamiliar foods (Dovey et al., 2008). Picky eating peaks around the ages of 2-5 and as many as 50% of caregivers report their child as being a picky eater by the time the child is two years old (Carruth et al., 1998; Carruth et al., 2004; Dovey et al., 2008). Many parents are concerned about their child's pickiness and seek guidance on how to effectively manage this problematic mealtime behavior (Cullen et al., 2000; Jacobi et al., 2003; van der Horst, 2012). Furthermore, picky eating has been linked to several negative outcomes such as underweight (Dubois et al., 2007), increased risk for developing and eating disorder (Marchi & Cohen, 1990), anxiety (Jacobi, Schmitz, & Agras, 2008), and depression later in life (Zucker et al., 2015).

Traditionally, parents have been responsible for determining their child's diet and how they eat. Today however, children are cared for in multiple settings, including non-parental childcare. In the U.S., two popular non-parental childcare settings are center- and home-based childcare. It is estimated that 33% of children under age 5 are cared for in these non-parental childcare settings where they can consume 33-50% of their calorie needs per day (Bollella et al.,

1999; Laughlin, 2013), making childcare providers potentially as influential as parents in the development of child eating habits and preferences (Nahikian-Nelms, 1997; Nicklas et al., 2001).

The long term goal of this research is to aid parents and childcare providers in raising children to be healthy eaters. Before this goal can be accomplished however, we first must understand how the different mealtime environments, such as center-based childcare (CBCC) and home-based childcare (HBCC), and the caregivers (i.e., parents and childcare provider) within these environments impact picky eating behaviors in children.

Though most children first learn how to eat at home, preschool aged children often eat meals at both home and at their childcare location. Within the home location, lessons learned regarding mealtime (Branen & Fletcher, 1999; Fletcher, Branen, & Adair, 1997), food availability and accessibility (Baranowski, Cullen, & Baranowski, 1999; Cullen et al., 2000; Patrick & Nicklas, 2005), and family mealtimes (Andaya et al., 2011; Fulkerson et al, 2009) are all factors that can influence child eating habits and preferences. Within the childcare location, the type of childcare and the policies surrounding mealtime based on the type of childcare dictate how mealtimes are conducted, and likewise can impact child eating habits (Martyniuk et al., 2016; Sigman-Grant et al., 2008).

Apart from being the gatekeepers to what food the child has access to, caregivers can impact child eating behavior with the mealtime strategies they utilize. Effective mealtime strategies that increase child preference for a variety of foods include repeated exposure and tasting to foods (Birch & Marlin, 1982; Cooke, 2007; Sullivan & Birch, 1990), modeling of food intake (Harper & Sanders, 1975; Moore, Tapper, & Murphy, 2007; Nicklas et al., 2001), and encouragement to try or consume foods (Vereecken et al., 2009). Ineffective strategies that decrease child preference for a variety of foods include pressuring to eat (Galloway et al., 2005;

Galloway et al., 2006), food restriction (Faith et al., 2004; Fisher & Birch, 1999), and the use of rewards when used a contingency factor (Birch et al., 1982; Birch, Marlin, & Rotter, 1984; Lowe et al., 2004).

Studies that investigated the utilization of reported parental mealtime strategies found that parents report using a plethora of mealtime strategies, but that most could be condense to modeling, influencing the child's attitude, pressuring to eat, rewards, restriction, repeated exposure, indirect strategies such as presenting the food in a certain way, and miscellaneous (Moore et al., 2007). An observational study of parental mealtime strategy utilization found that a majority of comments made regarding food at mealtime were negative and concluded that parents should use more positive or neutral comments at mealtime in order to avoid negatively impact child food intake (Koivisto, Fellenius, & Sjöden, 1994).

Studies that investigated the utilization of childcare feeding strategies found that only about half of childcare providers were observed to sit and eat with their students at mealtime, even though modeling of healthy food consumption is a recommended strategy for childcare providers (Neelon & Briley, 2011; Nicklas et al., 2001). Similarly, encouragement was also only observed in about half of childcare providers (Nahikian-Nelms, 1997). In addition, family-style meal service, a practice also recommended to be used in childcare and that allows children to serve themselves the amount of food they want from a communal serving platter, was found to be utilized in only 15% of childcare centers in 1997 (Nahikian-Nelms, 1997). Since then, the amount of childcare facilities that utilize family-style meal service has increased, perhaps due to the inclusion of this strategy in recommendations from third party organizations such as the Academy of Nutrition and Dietetics (Nutrition Standards for Child-care Programs, 1994; Nutrition Standards For Child-Care Programs, 1999).

Although research has been conducted on the home and childcare environments as well as on caregiver mealtime strategies, most have done so separately, especially with regards to picky eating. Moreover, an overwhelming majority of literature has focused on parents and the home location, even though millions of children are cared for in non-parental childcare settings each day. In addition, few studies have included observational data within the home and childcare environments, nor have they included HBCC in their analysis. Therefore, the differences in mealtime environment between home and childcare, differences in parent and childcare provider mealtime strategies, and their impact on child picky eating behavior are not well understood.

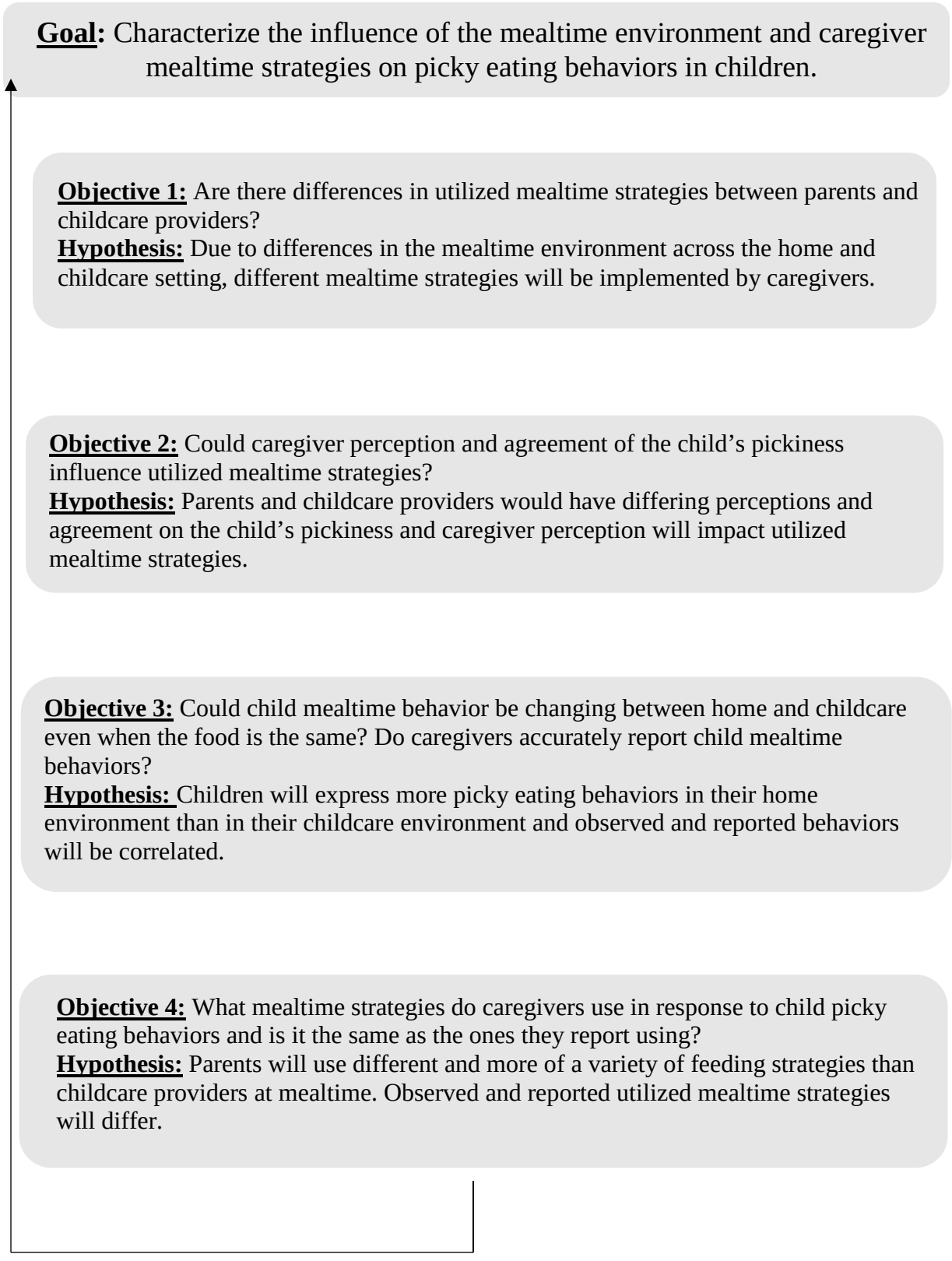
1.2 Objectives

The ***long-term*** goal of this line of investigation is to aid parents and childcare providers in raising children to be healthy eaters. To contribute to this goal, the aim of this thesis research was to characterize the influence of the mealtime environment and caregiver mealtime strategies on picky eating behaviors in children. The research objectives were undertaken to: 1) identify differences in mealtime strategies between parents and childcare providers (Chapter 3), 2) compare differences in caregiver perception and agreement of child pickiness and its influence on utilized mealtime strategies (Chapter 4), 3) compare observed and reported child picky eating behaviors between the home and childcare environments (Chapter 5), and 4) compare observed and reported caregiver mealtime strategies in response to child picky eating behavior between the home and childcare environment (Chapter 6). A flow chart of the research questions that were the basis of each objective, as well as the hypothesis for each objective, has been included (**Figure 1.1**).

To fulfill our objectives, lunch observations via videotape were conducted for 26 CBCC children and 24 HBCC children in their home and childcare location. Children and their caregivers were observed consuming two meals in each location: a popular meal and non-popular meal. This resulted in a total of 200 lunch observations.

In addition, parents and childcare providers completed the Mealtime Assessment Survey (MAS) which assessed the child's typical mealtime behavior and the Parent/Teacher Mealtime Strategies Survey (PMS/TMS) which assessed typical mealtime strategies utilized by caregivers. The collective results from this study will further elucidate how differences in mealtime environments and caregiver feeding strategies impact child picky eating behavior in order to aid caregivers in establishing healthy eating habits in children.

Figure 1.1: Thesis Goal and Objectives Flow Diagram.



CHAPTER 2
Literature Review

2.1 Introduction

Feeding children is a complex task, as child food preferences, the mealtime setting, and caregiver mealtime strategies can all impact how the child consumes food (Birch & Davison, 2001; Carruth et al., 1998a; Dovey et al., 2008; Scaglioni, Salvioni, & Galimberti, 2008). These, along with other factors, can impact how the child eats in that they do not consume the appropriate variety or quantity of food. This type of behavior is oftentimes categorized as picky eating. Picky eating has been linked to several negative outcomes (Cullen et al., 2001; Dubois et al., 2007; Jacobi et al., 2003; Marchi & Cohen, 1990; van der Horst, 2012; Zucker et al., 2015) and is cause for concern for caregivers (Galloway et al., 2005). In order to aid caregivers in effectively managing child picky eating behaviors we must understand how children's food preferences are formed, barriers to healthy food preference formation, the environments in which children consume meals, and caregiver mealtime strategy utilization. The following sections within this literature review explore each of these topics.

2.2 Development of Food Preference Formation

The formation of preferences for healthy foods is critical during early childhood for several reasons (Birch, 1998). First, early childhood is time of rapid physical growth and development; without adequate nutrients, optimal physical growth and cognitive development can be impaired. In addition, early childhood is when children are gaining independence from their caregivers and forming mealtime habits that tend to persist into adulthood (Nicklaus et al., 2005; C. Schwartz et al., 2011). If children develop preferences for calorically high, low nutrient

foods or have a diet that is lacking variety these preferences can continue throughout the child's life, potentially impacting their overall health.

The development of food preferences are affected by several factors, including genetic, caregiver, and environmental influences (Birch, 1999; Patrick & Nicklas, 2005). Infants have an innate preference for the basic taste of sweet and salty, are neutral for umami, and reject bitter and sour (Scaglioni et al., 2008; C. Schwartz et al., 2011). It has been theorized that rejection of bitter and sour taste serves as a protective mechanism embedded within human genes during evolution, as toxic and potentially harmful items tended to be bitter or sour (Beauchamp & Mennella, 2009). Unfortunately, several foods we now know to be beneficial, such as fruits and vegetables, may also have sour or bitter taste components, and are typically rejected until familiarity has been gained (Sullivan & Birch, 1994; Wardle et al., 2003).

Since caregivers are the gatekeepers of children's access to food, they can greatly influence children's food preferences (Gregory, Paxton, & Brozovic, 2011). This is because children tend to prefer what they are familiar with (Cooke, 2007). Therefore, the foods that are frequently provided by the caregiver typically dictates a child's preference for that food.

Furthermore, a caregiver's parenting style can influence the development of children's eating habits, which, in turn, can impact their food preferences (Blissett, 2011; Patrick et al., 2005). Parenting styles are classifications of how parents raise their children, and are based off of the amount of control or demandingness the parent possesses in their rearing practices contrast to their warmth (Baumrind, 1966; Baumrind, 1971). Four styles have been identified: authoritarian, authoritative, permissive, and neglectful (Baumrind, 1971). Authoritarian parents exert the most control, the most demanding, and have the least amount of warmth. On the other hand, authoritative parents have high demands and control, but also high warmth. Permissive parents

have low control and demand but high warmth. Lastly, neglectful parents are low in control, demandingness, and warmth (Baumrind, 1971).

Authoritative parenting style has been found to have the most positive outcomes with regards to the formation of healthy eating habits in children, while permissive and authoritarian parenting have been found to be negatively associated with fruit and vegetable availability and consumption (Blissett, 2011; Hughes et al., 2005; Patrick et al., 2005; Sleddens et al., 2010). While "healthy eating habits" can take different definitions, for the purpose of this literature review, healthy eating habits are defined as "consuming a variety of nutrient-dense foods within one's necessary caloric requirements".

Moreover, a caregiver's feeding style can impact child food preference formation (Birch & Davison, 2001; Scaglioni et al., 2008). Like parenting styles, feeding styles are also categorized as authoritarian, authoritative, and permissive; however, feeding styles are specific to feeding interactions, while parenting styles encompass broad parenting techniques (Blissett, 2011). For example, a parent with very little regard for what is consumed at mealtime but very high demands in other parenting domains would have a permissive feeding style, but not necessarily a permissive parenting style. In this case, it is possible for a parent to have a different feeding style than overall parenting style (Blissett, 2011). Similar to parenting styles, authoritative feeding style has been associated with greater fruit and vegetable availability and consumption in 3-5 year old children, while authoritarian feeding style was associated with the opposite: poorer fruit and vegetable availability and consumption (Patrick et al., 2005).

Lastly, the environment in which food is consumed influences food preference and selection (Crockett & Sims, 1995; Patrick & Nicklas, 2005; Skinner et al., 2002). Studies have shown that mealtimes with the TV on was associated with greater intake of sweet snacks, energy

drinks, and overall energy, and a decrease in vegetable consumption compared to mealtimes without the distraction of television (Boyland & Halford, 2013; Campbell, Crawford, & Ball, 2006; Crespo et al., 2001). Stressful environments have also been shown to decrease dietary quality and cause an increase in sweet food choices (Fiese, Jones, & Jarick, 2015; Kandiah et al., 2006; Oliver, Wardle, & Gibson, 2000). On the contrary, family mealtimes with young children shared in a positive environment have been linked with greater fruit and vegetable consumption in children (Christian et al., 2013) and decreased risk for unhealthy weight-control behaviors (Fulkerson et al., 2007).

A question, therefore, arises: How can the formation of healthy eating habits in early childhood be promoted and supported? Before that question can be addressed, first, the barriers to developing healthy food preferences in children must be examined.

2.3 Barriers to Successful Feeding: Picky Eating Behavior

A common barrier that up to 50% caregivers report when feeding their children is picky eating behavior (Carruth et al., 2004; Cathey & Gaylord, 2004). Picky eating behaviors are typically defined as having low dietary variety and rejecting both familiar and unfamiliar foods. These behaviors are most likely to be reported between the ages of 2-5 years, when children are transitioning from soft foods to table foods and gaining autonomy from their caregivers (Carruth et al., 1998b; Carruth et al., 2004; Dovey et al., 2008). These behaviors have been linked to several negative outcomes such as underweight (Dubois et al., 2007), depression (Zucker et al., 2015), increased risk for developing unhealthy eating habits (Marchi & Cohen, 1990), and parental concern (Cullen et al., 2000; Jacobi et al., 2003; van der Horst, 2012).

Because eating habits established during childhood tend to persist into adulthood (C. Schwartz et al., 2011) and several outcomes have been linked to picky eating behaviors in childhood (Cullen et al., 2001; Dubois et al., 2007; Jacobi et al., 2003; Marchi & Cohen, 1990; van der Horst, 2012; Zucker et al., 2015), it is imperative that healthy eating habits are taught from a young age. Parents with picky eaters report concerns over child growth, social development, and lack of direction or support in managing their child's difficult mealtime behavior (Evans et al., 2011; Galloway et al., 2005; van der Horst, 2012). In order to aid caregivers in raising the healthy eaters, we must look to previous studies that have investigated different mealtime environments and how they impact child mealtime behavior.

2.4 The Mealtime Environment

The Family Home

Typically, children first learn to eat at home, and what they learn as a child at home can be recalled even as a young adult. For example, young adults who take nutrition into consideration when selecting food was related to their memory of their parents discussing nutrition with them during their childhood (Branen & Fletcher, 1999). Furthermore, a different study found that older adolescent's memories of feeding practices used at home were positively correlated with the practices they planned on using to feed their own children (Fletcher, Branen, & Adair, 1997). These results highlight not only the lasting effects that feeding practices established by parents at home have on children as they age, but also the importance of using healthy eating habits within the home environment.

Likewise, the physical environment of the home mealtime setting is important in forming childhood mealtime habits. Research has shown that children eat foods that are available and

easily accessible (Patrick & Nicklas, 2005). Therefore, children are more likely to eat fruits and vegetables if the family home contains these items (Cullen et al., 2000; Hearn et al., 1998). Moreover, if fruits and vegetables are accessible, meaning that they are easy to reach and ready to eat, the likelihood that children consume them also increases (Baranowski et al., 1999).

One aspect unique to the home mealtime environment is the family mealtime. Family meals are usually defined as family members (some, most, or all members, depending on the study) eating food together (Hammons & Fiese, 2011). The benefits of positive family mealtime interactions are extensive and go well beyond the formation of healthy eating habits. For example, children that eat with their families are less likely to use tobacco, alcohol, or marijuana, have a low grade point average, depressive symptoms, and suicidal involvement (Eisenberg et al., 2004; Fruh et al. 2011).

Nutritionally, more family dinners eaten together have been positively associated with breakfast consumption and fruit and vegetable intake (Fulkerson et al., 2009; Videon & Manning, 2003). Additionally, children who ate breakfast with their families at least four times per week were more likely to consume fruits and vegetables and children who ate family meals without the television on were less likely to consume soda and chips (Andaya et al., 2011). Indeed, family meals can be the most opportune time to establish healthy eating habits in young children, through the foods provided and parental and sibling modeling of behavior. Conversely, youth who reported never eating dinner with their families were significantly more likely to be overweight and food insecure than families who reported eating together 5-7 times per week (Fulkerson et al., 2009).

The frequency of shared family meals can vary based on which meal is being surveyed (i.e., breakfast, lunch, dinner) and which demographic group is being targeted (Andaya et al.,

2011). One study that included almost 100,000 adolescents across 25 states found that around 45% of families reported eating dinner together 5-7 times per week, around 35% reported eating dinner together 2-4 times per week, and the remaining 20% reported eating together 0-1 times per week (Fulkerson et al., 2006). A systematic review article of 17 studies that included a total sample size of over 150,000 children and adolescents found similar results: 52% of families reported sharing meals 5-7 nights per week, 31% 1-4 nights per week, and 14% reported that they did not share any meals together (Hammons & Fiese, 2011).

Barriers towards family meals reported by mothers include: lack of time to plan meals, too much conflict at mealtime, children's pickiness, lack of husband support, and not enough coordination between family member schedules (Fulkerson et al., 2008; Fulkerson et al., 2011; Quick et al., 2011). Strategies that aid families in overcoming these barriers include: ensuring that it is communicated to families the benefits of eating together, encouraging parents that eating together as a family is enough and that the meal does not have to be "perfect," consulting with healthcare professionals such as dietitians for easy, healthy meals that can be made quickly, coordinating schedules ahead of time to be able to eat together, and limit school and other activities that interfere with dinner time (Fiese & Schwartz, 2008; Johnson et al., 2006; Quick et al., 2011; Spear, 2006). If families can overcome the barriers that prevent them from sharing meals together it has the potential to positively impact their child's health and eating behaviors.

The Childcare Environment

Though parents are usually considered a child's primary caregivers, today, millions of children are also cared for in non-parental childcare settings. In fact, approximately 1/3 of children under age of five years are cared for in non-parental childcare settings for an average of 35 hours per week (Laughlin, 2013). Children usually consume at least one meal and can

consume up to one half of their daily nutrient needs in these settings (Bollella et al., 1999), making these locations especially important in the shaping of childhood eating habits (Dev et al., 2014; Natale, Page, & Sanders, 2014; Neelon & Briley, 2011).

Center-based Childcare (CBCC)

In the US, around 66% of families utilize center-based childcare (Laughlin, 2013). Center-based childcare (CBCC) settings are similar to a school setting in their structure; children are organized by classrooms based on age, there is at least one caregiver per classroom, and typically there are standardized policies and procedures in place that specify standards of care (Natale et al., 2014). Most CBCC also have some set of policies regarding lunchtime (American Academy of Pediatrics et al., 2002; Sigman-Grant et al., 2008). For example, Head Start centers require that each child in half-day center-based childcare must receive meals and snacks that provide at least 1/3 of their nutritional needs, if the child is cared for a full day they must provide 1/2 to 2/3 of the child's daily nutrient needs, that a variety of food is served to broaden each child's food experiences, that food is not used as punishment or reward, that each child is encouraged but not forced to taste food, and that sufficient time is allowed for each child to eat (US Department of Health and Human Services, 2015). Other centers that participate in the Child and Adult Care Food Program (CACFP) have specific requirements on what food groups to serve and how much to serve children in order to receive reimbursement (Schwartz et al., 2015; United States Department of Agriculture Food and Nutrition Service, 2014).

Home-based Childcare (HBCC)

Another popular form of non-parental childcare that is utilized by about 33% of families is HBCC (Laughlin, 2013). Home-based childcare is where children are cared for in the caregiver's house. These facilities are not as standardized as CBCC (Kaphingst, French, & Story,

2006; Martyniuk et al., 2016). Home-based childcare setting vary greatly with regards to number of children that are being cared within each center, ages of children, and policies governing the HBCC, especially depending on the caregiver's licensing status (Martyniuk et al., 2016). Because of this, not only can mealtimes between HBCC and CBCC vary greatly, but mealtimes between different HBCC settings can also significantly differ (Benjamin et al., 2009; Natale et al., 2014).

Regardless of the mealtime environment in which children are cared for, effective and ineffective mealtime strategies are sought out by all caregivers. The following sections address studies that investigated mealtime strategies to increase liking and consumption of certain foods in children.

2.5 Mealtime Strategies

Caregivers are largely influential in their child's development, and because of this, the feeding strategies that they utilize are equally influential in the development, and potential persistence, of their child's eating habits. Researchers have investigated what mealtime strategies should be used to optimize healthy eating habit formation. Effective and ineffective mealtime strategies are discussed in the following sections.

Effective Mealtime Strategies

Effective feeding strategies are those that increase food liking and consumption for a certain food, while ineffective mealtime strategies do the opposite. Repeated exposure and tasting to foods is a feeding strategy proven multiple times to be effective (Birch & Marlin, 1982; Cooke, 2007; Sullivan & Birch, 1990). Notably, the younger the child, the less exposure

they may need to accept the food. Studies with infants found that just one exposure to a new food dramatically increased their liking and consumption of that food (Sullivan & Birch, 1994), while eight to 15 exposures were needed for the same reaction for three to four year olds (Sullivan & Birch, 1990).

A different study found that children that were introduced to a variety of foods during the weaning period, the period between breast or formula fed milk to table food, had a higher association of consuming a variety of foods when they were 2-6 years old than those that did not receive as much exposure (Cooke et al., 2004). In addition, a longitudinal study found that repeated exposure to fruits during the first 2 years of life predicted greater variety of fruit consumption when the children were 6-8 years old (Skinner et al., 2002). These results highlight not only the effectiveness of repeated exposure at increasing liking and consumption, but also the importance of exposing a variety of foods early in life.

Another effective strategy at increasing food consumption and liking is adult, sibling, and peer modelling of food consumption, especially when paired with enthusiastic positive comments (Moore, Tapper, & Murphy, 2007). More children tried a food when they observed an adult also eating than when they were just offered to try the food (Harper & Sanders, 1975). Further, this study found that more children tried more food if the adult modeling the food was their mother instead of an adult "visitor." These findings can be applied to childcare providers as well in that modeling by childcare providers can be an effective mealtime strategy (Nicklas et al., 2001). However, one study found that it may be particularly important for childcare provider to use enthusiastic comments in addition to modeling due to potential overshadowing by peer effects (Hendy, 1999).

Siblings also have an influence over children's food consumption and preference through modelling. One study that focused on children's food aversions as related to their family members found higher identical food aversions between siblings than parents (McCarthy, 1935). Another study investigated a target child food preferences compared to their mother, father, and closest sibling and found preferences to be similar to all family members, but especially their closest sibling (Pliner & Pelchat, 1986). These results indicate that sibling modeling of food choices can highly influence whether the other sibling also likes the food, perhaps even more so than other family members.

Additionally, peers who model food choices have been found to be effective at increasing food preferences. One study placed a target child with 3 to 4 peers and then served them a preferred and non-preferred food item. The first day the target child chose the food first, while on days 2-4 the peers chose the food first. The researchers also had the target child complete surveys on their preferred and non-preferred foods. Results showed that by day 4, the target child switched their food choice and consumption from the preferred food to the least preferred food as indicated by survey and by observation, indicating the influence the peers had on their food selection (Birch, 1980).

Encouragement has likewise been found to be an effective mealtime strategy. Encouragement strategies are positive and motivating, for example "Great job trying the broccoli, you should try the grapes as well!" or "this sandwich is delicious and I think you would really like it too." Parents who encourage their children to try new foods saw an increase in daily consumption of vegetables (Vereecken et al., 2009). Encouragement has been found to be effective in other locations besides the home as well. When school food service staff verbally encouraged children to choose fruits and vegetables significantly higher intakes of fruits and

vegetables were observed to be consumed (Perry et al., 2004). Using encouragement as a strategy is often characteristic of caregivers who are authoritative, or in other words, have high expectations but are also flexible and have warmth (Patrick et al., 2005). These caregivers are those that are more likely to utilize effective mealtime strategies and is associated with the most positive child feeding outcomes (Hughes et al., 2005; Mitchell et al., 2013).

Ineffective Mealtime Strategies

Contrast to effective mealtime strategies, ineffective mealtime strategies decrease liking for foods. One strategy found to negatively impact food preference and consumption is pressuring to eat (Galloway et al., 2005; Galloway et al., 2006). Pressuring to eat is thought to induce resistance to eating because the caregiver is violating the child's free will and removing the little control a young child has (Galloway et al., 2006). Pressuring usually occurs because the caregiver perceives that the child is not eating enough, therefore pressures them to eat more, the child resists, the caregiver tries harder, and the situation worsens. The continuation of pressuring to eat can even dysregulate satiety cues later in life due to constant disregard of the feeling of fullness because of pressure to continue to eat (Carper, Fisher, & Birch, 2000). Pressuring a child to eat can take several forms, such as spoon feeding the child when the child is old enough to eat on their own, not allowing them to leave the table until their plate has been clean, etc.

Restricting food has also been shown to be an ineffective mealtime strategy because it does the opposite that pressuring does: it places extra desire, liking, and consumption on the restricted food which is typically calorically high, nutritionally low quality foods (Fisher & Birch, 1999). Since the restricted food is usually palatable "unhealthy" foods, when the child does get the restricted food they can over consume it. In fact, parental restriction of palatable

foods was found to be associated with increased child eating and weight status (Faith et al., 2004). Unfortunately, it seems as though this reaction only occurs when the restricted food is a calorically high, low nutrient food. In other words, it is not likely that the same reaction would occur if caregivers were to restrict fruits and vegetables.

The use of rewards during mealtime have been found to be both effective and ineffective, and its success depends on the context by which it was delivered. If the reward is used as a contingency factor, as in, "you must eat your broccoli to get your toy," using rewards has been found to negatively impact food preferences (Birch et al., 1982; Birch, Marlin, & Rotter, 1984). However, if the child receives a reward for eating, then it has been related to positive liking and increased consumption (Lowe et al., 2004). An example of positive use of reward would be rewarding the child with a sticker or a pen if they tried the broccoli. If caregivers wish to use rewards during mealtime they should be especially careful to use this strategy within the correct context.

2.6 Parental Mealtime Strategy Utilization

While it is helpful to understand which strategies have been reported to be effective and ineffective at increasing liking and food consumption, perhaps it is more important to understand which strategies caregivers report using at mealtime, because these are the strategies that children are actually exposed to. A qualitative study that conducted one-on-one interviews with mothers found that they mentioned using 126 strategies during mealtime, 51 of those being unique to mother/child dyads (Moore et al., 2007). On average, mothers' mealtime strategy repertories included 19 strategies. They chose which strategy to use based on their long- and short-term goals (i.e., establishing a varied diet as a long-term goal or avoiding the child going to

bed hungry as a short-term goal) for mealtime. All strategies could be condensed to: modeling, influencing the child's attitude, pressuring to eat, rewards, restriction, repeated exposure, indirect strategies such as presenting the food in a certain way, and miscellaneous. Interestingly, it was found that mothers' primary objective was to establish behaviors that were associated with having a well-balanced diet instead of increasing liking for particular foods. The authors concluded that further observational studies are needed to explore the characteristics of how the strategies are utilized within the context of a meal and the actual outcomes that come of the strategy.

An observational study that investigated child and parental eating behavior noted that of all the observed parental behaviors, 22% consisted of statements about food and eating (Koivisto, Fellenius, & Sjöden, 1994). The researchers noted that only 2% of comments were positive about the child's eating such as "you ate the peas, good", while 11% were negative such as "you're eating too fast." Direct prompting, such as "eat the potatoes first!" consisted of 4% of total parental comments. The authors related these comments to child food intake and concluded that parental mealtime comments/strategies may have an impact on child food intake. Further, they concluded that parents of young children should use more positive or neutral verbal comments during meals.

2.7 Childcare Provider Mealtime Strategy Utilization

While parents are pivotal in the development of child eating habits, the widespread use of non-parental childcare in the U.S. implies that childcare providers are also influential in the development of child eating habits (Hughes et al., 2007; Nahikian-Nelms, 1997) and parents are aware of this influence. A qualitative study done with 68 parents found that parents perceived

childcare providers as having high importance in the shaping of young children's food preferences and, in some cases, as being just as important as themselves (Wright & Radcliffe, 1992).

Given the importance that childcare providers have on children's food preference formation, it is necessary to understand what strategies they utilize during mealtime. Study results that showed preschool children were more likely to eat foods if they saw an adult eating the same foods (otherwise known as modeling) caused organizations such as the Academy of Nutrition and Dietetics, Head Start, and the National Academy of Early Childhood Programs to recommend that childcare providers sit and eat with children during mealtime (Neelon & Briley, 2011; Nicklas et al., 2001). However, whether the childcare providers actually practice this strategy and properly model healthy eating practices to children is not as well investigated. One study found that of 113 childcare providers surveyed and observed, only 53% were observed to sit and eat the same foods with children during the mealtime; the others did not eat at all or if they did eat ate fast food and soda (Nahikian-Nelms, 1997). In this same study, positive encouragement to try the offered foods, a mealtime strategy found to be effective, was observed in only 59% of providers. Optimistically, this study found that only 7% of providers were observed to use food as a reward, which has been shown to have both positive and negative effects on children's food preferences depending on how the reward strategy is presented to the child.

One strategy specific to childcare locations is the use of family style or pre-plated meal service. Pre-plated meal service is when the food is already served to the child so they do not have control over the amount of food on their plate (Sigman-Grant et al., 2008). On the contrary, family style meal service allows children and others at the meal to serve themselves the quantity

of food they want and pass the food along to the person next to them (Dev et al., 2014). Currently, family style meal service is recommended by the Institute of Medicine, the American Academy of Pediatrics and the Academy of Nutrition Dietetics as a healthful practice that should be used in childcare facilities (Early childhood obesity prevention policies.2011; American Academy of Pediatrics, 2002; Neelon & Briley, 2011).

Family style meal service is thought to be beneficial because it may encourage better self-regulation in children because they are choosing how much they want to eat, instead of eating what they have been served (Johnson & Birch, 1994; Orlet-Fisher, Rolls, & Birch, 2003). In addition, family style meal service improve gross motor coordination in young children (Dev et al., 2014; Nahikian-Nelms, 1997).

In the study of (Nahikian-Nelms, 1997), only 3 of the 24 centers where the 113 providers worked used family-style meal service, the other 21 centers used pre-plated meal service (Nahikian-Nelms, 1997). Contrast to this finding, a study done a little over a decade later found that 44% of childcare centers used family-style meal service in four Western states, while 36% did not provide food at lunch, and instead, the children brought their own school lunches, and the remaining 21% pre-plated food (Sigman-Grant et al., 2008). The increase in use of family style meal service could be due to the increase in recommendations from organizations such as the Academy of Nutrition and Dietetics to practice this type of meal service (Nutrition Standards for Child-care Programs, 1994; Nutrition Standards For Child-Care Programs, 1999).

2.8 Concluding Remarks

Teaching a child how to eat is a complex, multi-component, and hugely important process that has the potential to impact the child's health as they age. Because of this, it is

important to establish healthy eating habits early in life, but many caregivers of young children struggle with their child's picky eating behavior. To add to the complexity, even though decades ago children were cared for mostly at home, today children are cared for in multiple environments, including childcare.

Though there is a knowledge base on how the home environment is different than the childcare environment and research findings on effective and ineffective mealtime strategies, there is a gap in the literature that addresses differences in mealtime strategy utilization between parents and childcare providers for the same child. In addition, no studies have observationally investigated differences in child and caregiver mealtime behavior between the child's home and childcare location while controlling for the food being offered. Therefore, the overall goal of this research was to characterize the influence of the mealtime environment and caregiver mealtime strategies on picky eating behaviors in children. In order to accomplish this goal several specific aims were undertaken: 1) Identify differences in mealtime strategies between parents and childcare providers (Chapter 3); 2) Compare differences in caregiver perception and agreement of child pickiness and its influence on utilized mealtime strategies (Chapter 4); 3) Compare observed and reported child picky eating behaviors between the home and childcare environments (Chapter 5); and 4) Compare observed and reported caregiver mealtime strategies in response to child picky eating behavior between the home and childcare environments (Chapter 6).

CHAPTER 3
Differences in Utilized Mealtime Strategies between Parents and Childcare Providers

3.1 Abstract

Eating habits developed during childhood tend to persist into adulthood. Although parents are typically considered a child's primary caregiver, millions of children are placed in non-parental childcare. However, little is known about the feeding strategies utilized by parents and care providers. The objective of this study was to compare mealtime strategies utilized by parents and home-or center-based childcare providers. Parents (n = 47) of 3-5-year-old children and childcare providers from either home-based childcare (HBCC) (n = 22) or center-based childcare (CBCC) (n = 25) were enrolled in the study. Parents and providers completed the Parent or Teacher Mealtime Strategies Survey. Results revealed that parents and childcare providers used several strategies differently at mealtime. Furthermore, differences in strategy utilization were found between HBCC and CBCC parents. These findings show that children are exposed to different messages regarding mealtime between their home and childcare environment. Additionally, differences in feeding style exist between HBCC and CBCC parents and providers.

Key words: feeding strategies, family mealtime, childcare

3.2 Introduction

Food preferences established during childhood tend to persist into adulthood, making childhood an important time to lay the foundation of healthy eating habits (Birch, Savage, & Ventura, 2007; Blissett, 2011; Neelon & Briley, 2011). Unfortunately, picky eating, which is typically defined as having low dietary variety and rejecting new and familiar foods, is common in early childhood (Carruth et al., 2004). Previous studies have shown that childhood eating habits are shaped by a multitude of factors, including food availability and accessibility (Hearn et al., 1998), the mealtime environment (Birch & Fisher, 1998), peers (Birch, 1980), and caregivers (Neelon & Briley, 2011; Savage, Fisher & Birch, 2007), including the caregiver's feeding style (Hubbs-Tait et al., 2008; Patrick et al., 2005).

Although parents are typically considered as the child's primary caregiver, and most studies have focused on parent feeding styles and mealtime behaviors (Blissett, 2011; Patrick et al., 2005; Webber et al., 2010), today more than 12 million children in the U.S. attend non-parental childcare settings, where they can consume one-third to one-half of their daily energy intake (Dev, McBride & STRONG Kids Research Team, 2013; Larson et al., 2011a). More than half of children are enrolled in center-based childcare (CBCC) (Wallman, 2010). This type of childcare typically separates children into classrooms based on age and/or developmental stage. In contrast, home-based childcare (HBCC) settings are typically in the caregiver's home, the child-to-adult ratio is smaller than in CBCC and children of all ages can be cared for by the same caregiver (National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 2000).

The mealtime environment in these two childcare settings as well as the child's family home can differ markedly. Although most CBCC have policies and procedures regarding

mealtimes, they can vary from providing food, to not providing food at all, to requiring parents to pack their child's lunch. In addition, how food is presented to the children, family style versus pre-portioning food also varies between different CBCC (American Academy of Pediatrics et al., 2002; Sigman-Grant et al., 2008). Home-based childcare can be even more variable depending on their licensing status, involvement in programs, such as the Child and Adult Care Food Program, and number and age of children attending the childcare (Kaphingst, French, & Story, 2006). Lastly, mealtimes in the child's family home would be expected to be the most variable based on family structure (Levin, Kirby & Currie, 2012), perceived time constraints (Malhotra et al., 2013), and racial/cultural differences (Flores, Tomany-Korman & Olson, 2005).

Caregivers, including parents and childcare providers, have the potential to greatly influence child eating habits (Dev et al., 2013; Hughes et al., 2007; Nahikian-Nelms, 1997; Savage et al., 2007), but to our knowledge no studies have compared the mealtime strategies used by parents and childcare providers caring for the same child. Most studies have investigated parenting style or feeding style of either the parent or childcare provider and its impact on food consumption by the child (Blissett, 2011; Hughes et al., 2007; Kröller & Warschburger, 2008; Patrick et al., 2005). Studies in this area that do investigate feeding strategies of care providers commonly do not report differences in specific mealtime strategies based on mealtime settings. Lastly, most studies do not include the HBCC location (Forry et al., 2012) thus, comparisons between HBCC and CBCC caregivers and parents have not been investigated.

The objectives of this study were to identify differences in utilized mealtime strategies between 1) parents and childcare providers, independent of setting; 2) parents of children in HBCC and their HBCC providers; 3) parents and HBCC providers; 4) parents of children in CBCC and their CBCC providers; 5) CBCC and HBCC providers; and 6) parents who utilize

HBCC and parents who utilize CBCC (**Figure 3.1**). We hypothesized that different mealtime strategies would be implemented by parents and providers across different settings, home, CBCC and HBCC. We further hypothesized that parents who select to place their children in CBCC versus HBCC would also use different mealtime strategies.

3.3 Methods

Participants

A total of 67 parents and childcare providers were recruited from the Champaign-Urbana area to participate in the study via letters, flyers, community group meetings and phone calls. Participation requirements included having at least one child aged 3-5 years with no food allergies. The 3-5 year old age range for the study was determined based on previous literature that states that this age range is when picky eating behaviors peak (Cardona Cano et al., 2015; Carruth et al., 1998).

Participants completed either the Parent Mealtime Strategies Survey (PMS) if they were enrolled as a parent or the Teacher Mealtime Strategies Survey (TMS) if they were enrolled in the study as a childcare provider (**Table 3.1**). These surveys were developed through a series of focus groups and conjoint analyses examining actions displayed by children and caregivers during feedings (Boquin et al., 2014a; Boquin et al., 2014b, MacInnes, 2012).

Both surveys contained the same questions unless inapplicable due to differences in mealtime location (i.e., one of the questions on the PMS asked of child involvement in meal preparation, which is typically not applicable in a childcare setting) (Table 3.1). Each participant was specifically instructed to think about the child whom the survey was about and answer the questions accordingly. Parents and childcare providers filled out one survey per child, however,

if families had two children in the 3-5 year age range they could enroll both children if desired. Only one parent from CBCC and HBCC completed surveys for two children they enrolled in the study, all others only enrolled one child or had the mother complete the survey for one child and the father complete the survey for the other child. This resulted in 25 parents and 26 children from CBCC and 22 parents and 23 children from HBCC enrolled in the study.

In addition, some childcare providers completed more than one TMS if they cared for more than one child in their childcare participating in the study. Forty-five percent of HBCC providers completed only one TMS survey, because only one of their students was enrolled in the study, 18% completed two TMS surveys, and 36% completed three or more TMS surveys. All CBCC providers completed more than one TMS; 14% completed 2 surveys, 57% completed 3 surveys, 14% completed 4 surveys, and 14% completed more than 5 surveys. All materials and methods were approved by the University of Illinois Institute Review Board.

Data Analysis

Survey responses were on a 5-point Likert scale: Never, Rarely, Sometimes, Often, and Always. For statistical analysis, responses were dichotomized into "Yes/No" response categories where "Yes" included "Always, Often, Sometimes" and "No" included "Rarely, Never." This method of dichotomization is well accepted and has been used previously within the literature (Jacobi, Agras, Bryson & Hammer, 2003). Data were analyzed via a 2-way Chi-square of response to question on PMS/TMS and caregiver, either childcare provider or parent in Excel (Microsoft, Redmond, WA). Significance was set to $P \leq 0.05$.

3.4 Results

Demographics: Of the 67 participants, 11 were HBCC providers and 9 were CBCC providers. Forty-seven parents were then recruited from the enrolled childcare locations; 22 parents from HBCC and 25 from a CBCC center. Center-based childcare parents had more education, higher income, and a greater majority were of Asian ethnicity than HBCC parents. All childcare providers, regardless of location, were female. Most childcare providers were between the ages of 46-55 and Caucasian. More detailed demographic information can be found in **Table 3.2**.

Parents vs. Providers: Chi-square analysis revealed six out of 14 strategies from the PMS and TMS were found to be different between all parents and childcare providers (**Figure 3.2**), supporting our hypothesis that parents and childcare providers use strategies differently during mealtime. For this analysis, "all parents and all childcare providers" includes parents who utilize both types of day care and providers in both settings analyzed together. Results show that parents were more likely than childcare providers to utilize all six strategies: "arrange the food in an interesting way to make the meal fun ($p = 0.02$)," "require your child to try a bite of each food on their plate ($p = 0.008$)," "show disapproval if your child does not eat ($p = <0.001$)," "tell your child they cannot leave the table until a food is eaten ($p = <0.001$)," "spoon-feed your child to get them to eat ($p = 0.009$)," and "make the meal into a game to encourage eating ($p = 0.01$)."

HBCC Parents vs. HBCC Providers: Mealtime strategy comparison between HBCC providers and parents revealed only one strategy to be different, "show disapproval if your child does not eat ($p = <0.001$)" (**Figure 3.3**), supporting our hypothesis. Home-based childcare parents were more likely to utilize this strategy than HBCC providers.

Parents vs. HBCC providers: Two strategies were found to be significantly different between parents, independent of location, and HBCC providers: “teach your child about the food served at the meal ($p = 0.04$),” and “show disapproval if your child does not eat ($p = <0.001$)” (**Figure 3.4**), supporting our hypothesis. Home-based childcare providers were more likely to report teaching their students about the food served at the meal, while parents were more likely to show disapproval if their child did not eat.

CBCC Parents vs. CBCC Providers: In contrast to the HBCC providers and parents where only one strategy differed, eight strategies differed between CBCC providers and parents, indicating that most of the differences seen in the comparison between all parents and all caregivers was due to CBCC parents and caregivers (**Figure 3.5**). Different strategies included: “arrange the food in an interesting way to make the meal fun ($p = <0.001$),” “require your child to try a bite of each food on their plate ($p = <0.001$),” “show disapproval if your child does not eat ($p = <0.001$),” “praise your child about their food intake or feeding skills ($p = <0.001$),” “tell your child they cannot leave the table until a food is eaten ($p = <0.001$),” “spoon-feed your child to get them to eat ($p = <0.001$),” “make the meal into a game to encourage eating ($p = 0.009$),” and “model to your child that mom and/or dad are eating the food so they should eat the food too ($p = 0.04$).”

CBCC Providers vs. HBCC Providers: Comparison of utilized mealtime strategies between HBCC and CBCC providers revealed that 9 out of 18 strategies differed (**Figure 3.6**), confirming our hypothesis. Strategies that differed included: “arrange the food in an interesting way to make the meal fun ($p = <0.001$),” “require your student to try a bite of each food in their plate ($p = <0.001$),” “praise your student about their food intake of feeding skills ($p = <0.001$),” “tell your student they cannot leave the table until the food is eaten ($p = <0.001$),” “tell your

student that the food tastes good ($p = 0.02$)," "spoon-feed your student to get them to eat ($p = 0.02$)," "make the meal into a game to encourage eating ($p = <0.001$)," "ignore your student's fussiness when are being picky about the food served ($p = 0.01$)," and "offer the child a reward for eating ($p = <0.001$)."

CBCC Parents vs HBCC Parents: When strategies were compared between parents who elected to enroll their child to CBCC compared to parents who chose HBCC, five out of 22 strategies on the PMS were found to be different (**Figure 3.7**), validating our hypothesis. The HBCC parents were more likely than CBCC parents to use all 5 strategies, which were: "offer your child a favorite food, snack or sweet/dessert for eating ($p = 0.03$)," "offer your child a non-food reward for eating food served at the meal ($p = 0.02$)," "involve your child in meal preparation ($p = 0.01$)," "ignore your child's fussiness when the child is being fussy about the food served ($p = <0.001$)," and "make the meal into a game to encourage eating ($p = 0.01$)."

3.5 Discussion

The results of this study showed that parents were more likely than childcare providers to utilize the six strategies that were found to be different between the two groups, suggesting that that children are likely receiving dissimilar messages surrounding mealtime behaviors between their childcare location and their family home. Incongruent messages at mealtime could, in turn, affect the child's eating behavior during a critical developmental period (Birch, Zimmerman & Hind, 1980).

Only one strategy differed between HBCC parents and providers, suggesting greater congruency in strategy utilization in this setting than the comparison between all childcare providers and parents. While our hypothesis that there would be differences in mealtime strategy

utilization between HBCC parents and providers is supported, there may be fewer differences between HBCC provider and parents than all childcare providers and parents due to the unique nature of HBCC. Home-based childcare may not have as many policies or procedures in place that a typical CBCC has, allowing for greater flexibility in the strategies they utilize (Tovar et al., 2015). Even if a HBCC participates in CACFP, as seven of the 11 HBCC in our study did, no policies are given regarding how to serve the food or what strategies to use during mealtime (Larson et al., 2011b). Consequently, they use more variety of mealtime strategies and are more similar to parents in their strategy utilization. In addition, because HBCC providers and parents typically know each other personally, they may better be able to coordinate how they feed the child, or may have similar beliefs regarding child feeding (Tovar et al., 2015).

When parents, independent of location, and HBCC providers were compared, only two strategies were utilized differently, further supporting our previous point that HBCC providers may be more similar to parents than other childcare providers in the mealtime strategies that are utilized. This result supplements the idea that the HBCC setting is a unique cross between a structured, school-like setting, and the family home, and because of this effects the way children are cared for, even at mealtime.

Comparison between CBCC parents and providers identified differences in utilization of eight of the mealtime strategies. These differences are likely due to the stark environmental differences between the family home and the structured, school-like setting of CBCC. Another reason why strategies are used differently between these caregivers may be due to differences in perceived child pickiness. For example, MacInnes and colleagues found differences in perceived child pickiness between a child's parent and their CBCC provider, but did not investigate whether pickiness perception impacted the types of mealtime strategies that were used

(MacInnes, 2012). However, it is reasonable to speculate that if a parent perceives the child as having poor mealtime behavior or pickiness, they may implement a greater variety of mealtime strategies.

Fifty percent of mealtime strategies were found to be utilized differently between HBCC and CBCC providers. Surprisingly, HBCC providers were more likely than CBCC providers to use all strategies, indicating their greater similarity to parents, since parents were also more likely to use more variety of mealtime strategies. The use of more strategies at mealtime by HBCC providers could also reflect the greater flexibility at mealtime regarding policies and procedures compared to CBCC (American Academy of Pediatrics et al., 2002; Sigman-Grant et al., 2008).

Lastly, mealtime strategies were compared between parents who utilize HBCC compared to those who utilize CBCC. Similar to HBCC providers, HBCC parents were more likely than CBCC parents to utilize all mealtime strategies. These results show that differences exist between parents who elect to use HBCC vs, CBCC, even in child feeding strategies that are utilized and suggest that parents who utilize different types of childcare may have innately different feeding, and potentially parenting or feeding styles.

3.6 Conclusion

This study is unique in that it compared the mealtime strategies that a child is exposed to in both the home and daycare environments. In addition, the differences in mealtime strategies used in the two most common non-parental care settings, namely CBCC and HBCC were compared. This study showed that parents and childcare providers use mealtime strategies differently, though which strategies are used depends on the caregiver group. These results

suggest that children who attend childcare, especially those attending CBCC, are receiving different messages regarding mealtimes. More research is needed to identify if incongruence in mealtime messages between home and childcare have negative effects on a child's eating habits or food preference. Additionally, differences in mealtime strategy usage is apparent between HBCC and CBCC, suggesting that the way children are fed in these childcare settings differs significantly. Lastly, parents who chose to use the two different types of childcare may have dissimilar feeding styles. This finding is of interest, since the decision on what type of child care to use is often made before the child is born or in the early postnatal period. Thus, the choice of a type of childcare is likely a reflection of the parent's parenting style as well.

This study is not without limitations. First, this project is part of a larger, observational study, and because of this, only one CBCC was recruited to participate. Though three separate classrooms were included in the analysis from this CBCC, findings should not be generalized to all CBCC, as policies and procedures regarding mealtime may differ from center to center. Second, we did not ask parents the motivation behind their selection of childcare. Collecting this kind of information may provide insight into how well parents and providers are aligned in their care for the same child including mealtime strategies. Third, we did not ask providers whether they were also parents and what mealtime strategies they utilized with their children. Had we collected this data we could have explored similarities in the mealtime strategies that providers utilize with their students and whether those are the same as the strategies they utilize with their children. In addition, we did not ask providers about their nutrition training. This information could have given insight into why certain mealtime strategies were utilized as opposed to others. Future studies can use the information from this research to create location-specific interventions

and education programs targeted around promoting consistent child feeding strategies across the home and childcare environments.

3.7 Tables and Figures

Table 3.1. Parent and Teacher Mealtime Strategies Survey Questions (MacInnes, 2012)

Question*	Parent Survey	Teacher Survey
Offer your child a favorite food, snack or sweet/dessert as a reward for eating.	X	
Offer your child a non-food reward for eating food served at a meal	X	
Withhold a favorite food, snack or sweet/dessert as a consequence for not eating.	X	
Involve your child in planning and preparing the meal.	X	
Make your child finish all of the meal before getting dessert.	X	
Make a different food for your child before the meal if they don't like what is being served.	X	
Make a different food for your child after the meal if they didn't eat the food that was served.	X	
Serve a combination of foods that are new and/or disliked with foods already preferred by your child/student	X	X
Arrange the food in an interesting way to make the meal fun	X	X
Teach your child/student about the food served at the meal	X	X
Require your child/student to try a bite of each food on their plate.	X	X
Show disapproval if your child/student does not eat.	X	X
Allow your child/student to choose the foods they want to eat from the food that is served.	X	X
Praise your child/student about their food intake or feeding skills.	X	X
Tell your child/student they cannot leave the table until a food is eaten.	X	X
Spoon-feed your child/student to get them to eat.	X	X
Ignore your child's/student's fussiness when they are being picky about the food served.	X	X
Encourage your child/student to try new foods.	X	X
Allow your child/student to eat what and how much they want at the majority of meals.	X	X
Make the meal into a game to encourage eating.	X	X
Model to your child that Mom and/or Dad/Teacher are eating the food so they should eat the food too.	X	X
Not need to use any strategies to get your child/student to eat at mealtime.	X	X
Tell your student they have to try a bite of everything before getting seconds		X
Withhold something as a consequence for not eating		X

*For the Parent Mealtime Strategy Survey the term "child" is used on the survey and the term "student" is used on the Teacher Mealtime Strategy Survey

Table 3.2. Participant Demographics (% total)

Demographics	CBCC n (% total)		HBCC n (% total)	
	Parent (n = 25)	Provider (n = 9)	Parent (n = 22)	Provider (n = 11)
Sex				
Female	16 (64)	9 (100)	17 (77)	11 (100)
Male	9 (36)	--	5 (23)	--
Marital Status				
Married	21 (84)	3 (33)	13 (59)	7 (64)
Single	4 (16)	6 (66)	9 (41)	4 (36)
I prefer not to say	--	--		
Age				
18-25	2 (8)	--	4 (18)	1 (9)
26-35	13 (52)	2 (22)	9 (41)	2 (18)
36-45	8 (32)	1 (11)	9 (41)	--
46-55	2 (8)	3 (33)	--	6 (27)
56-65	--	3 (33)	--	2 (18)
Ethnicity				
Caucasian	9 (36)	4 (44)	19 (86)	7 (64)
Asian	12 (48)	--	--	--
Black or African American	3 (12)	--	2 (9)	2 (18)
Hispanic or Latino	1 (4)	3 (33)	--	--
Other	--	2 (22)	1 (5)	2 (18)
Education Level				
High school graduate	--	1 (11)	2 (9)	2 (18)
Some college	5 (20)	1 (11)	5 (23)	4 (36)
Bachelor's degree	2 (8)	7 (77)	9 (41)	2 (18)
Post graduate degree	17 (68)	--	6 (27)	2 (18)
I prefer not to say	1 (4)	--		1 (9)
Income Level				
Under $25,000	5 (20)	3 (33)	3 (14)	1 (9)
$25,000 -$34,999	5 (20)	3 (33)	3 (14)	1 (9)

Table 3.2, continued

$35,000 –$49,999	1 (4)	--	2 (9)	2 (18)
$50,000 -$74,999	3 (12)	--	3 (14)	1 (9)
$75,000 -$99,999	--	1 (11)	8 (36)	2 (18)
$100,000 and over	11 (44)	--	2 (9)	1 (9)
I prefer not to say	--	2 (22)	1 (5)	3 (27)

Abbreviations: CBCC, Center-based childcare; HBCC, Home-based childcare

Figure 3.1. Caregiver comparisons for chapter analysis.

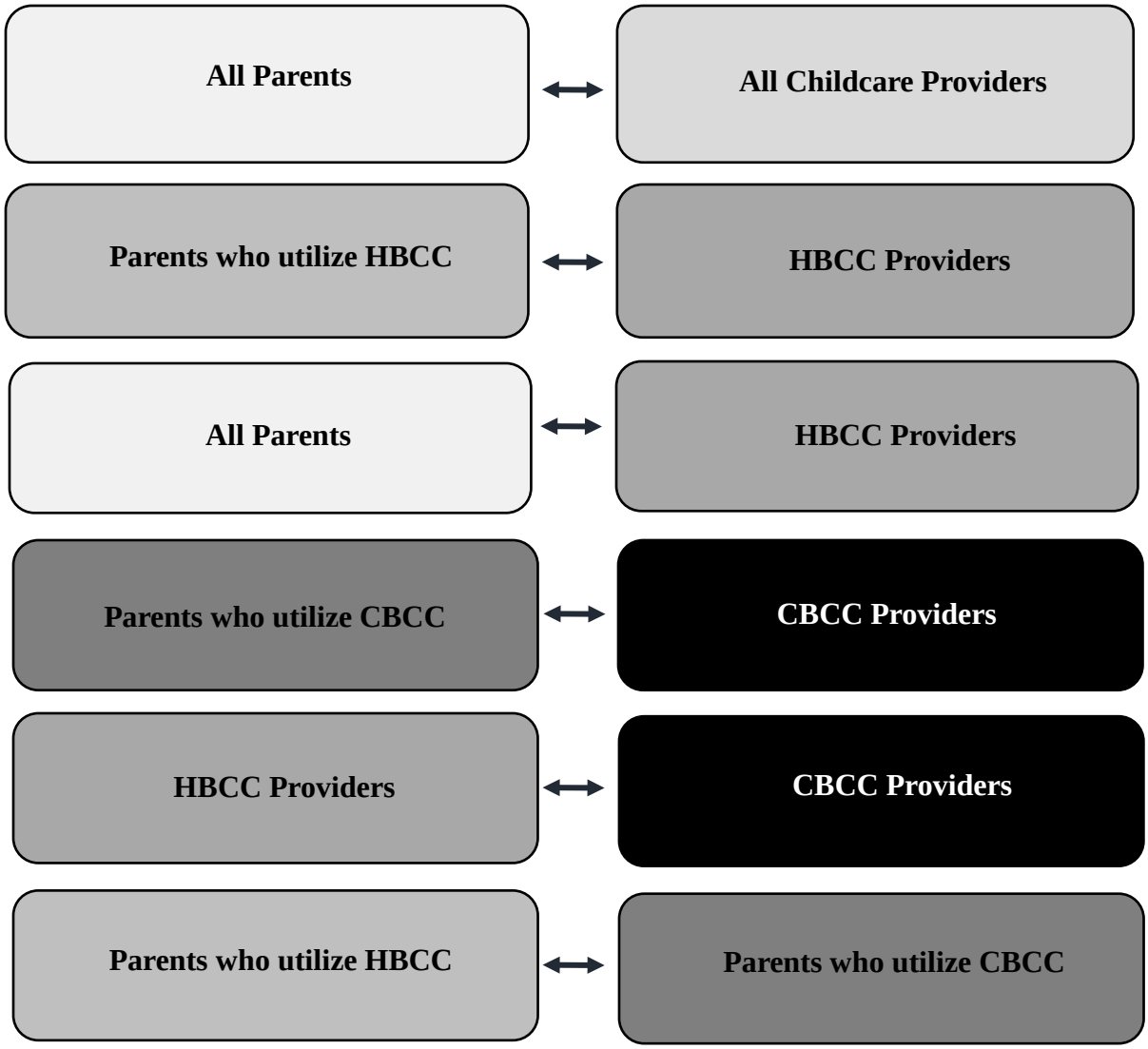
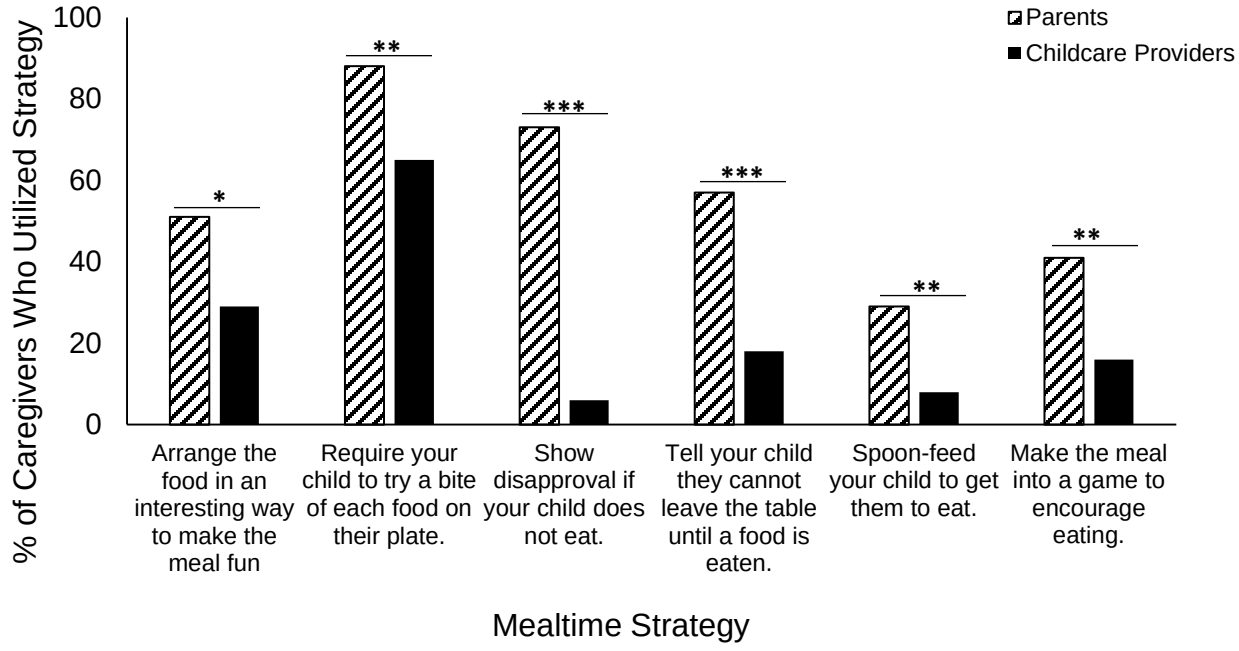
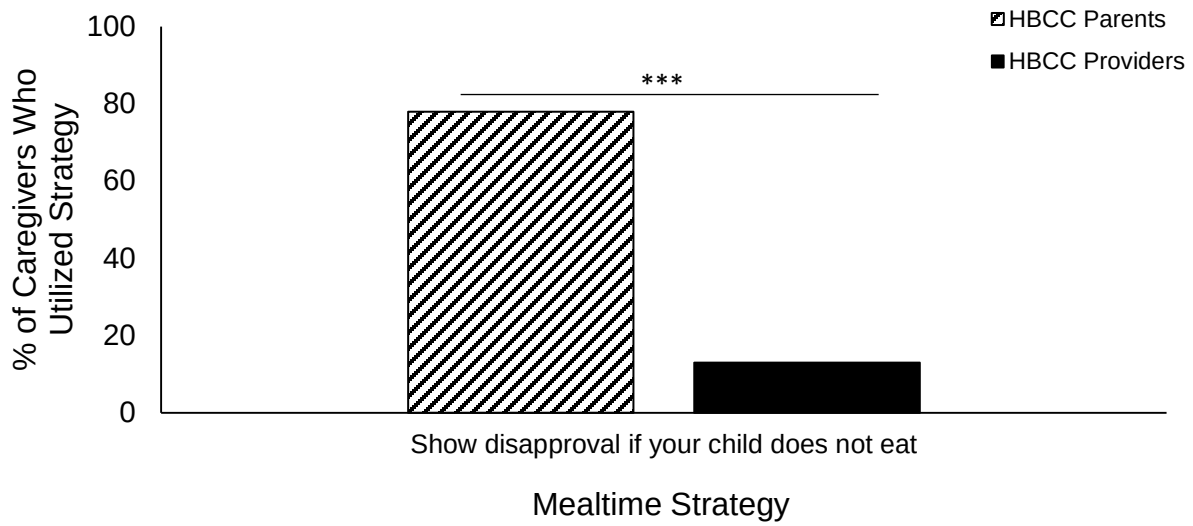


Figure 3.2. Differences in Mealtime Strategy Utilization between Parents (n = 47) and Childcare Providers (n = 20).



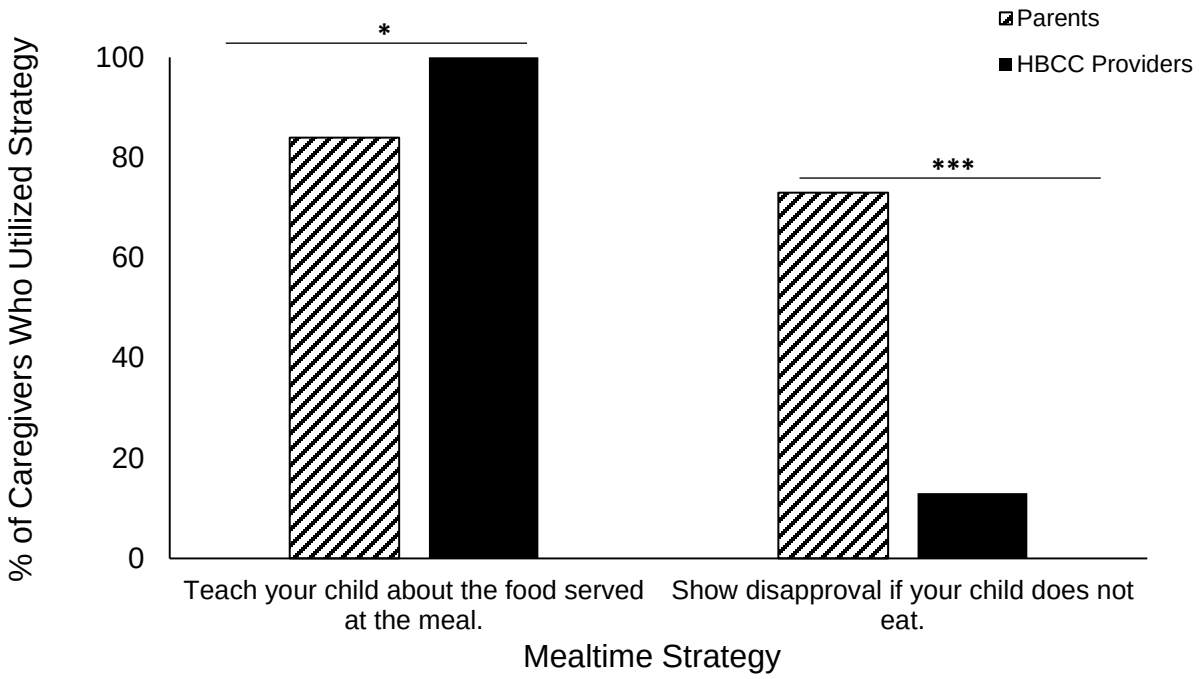
Data are presented as the average percent of parents or providers using that strategy. Statistical differences between groups are indicated as follows: *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$.

Figure 3.3. Differences in Mealtime Strategy Utilization between Home-based Childcare (HBCC) Parents (n = 22) and HBCC Providers (n = 11).



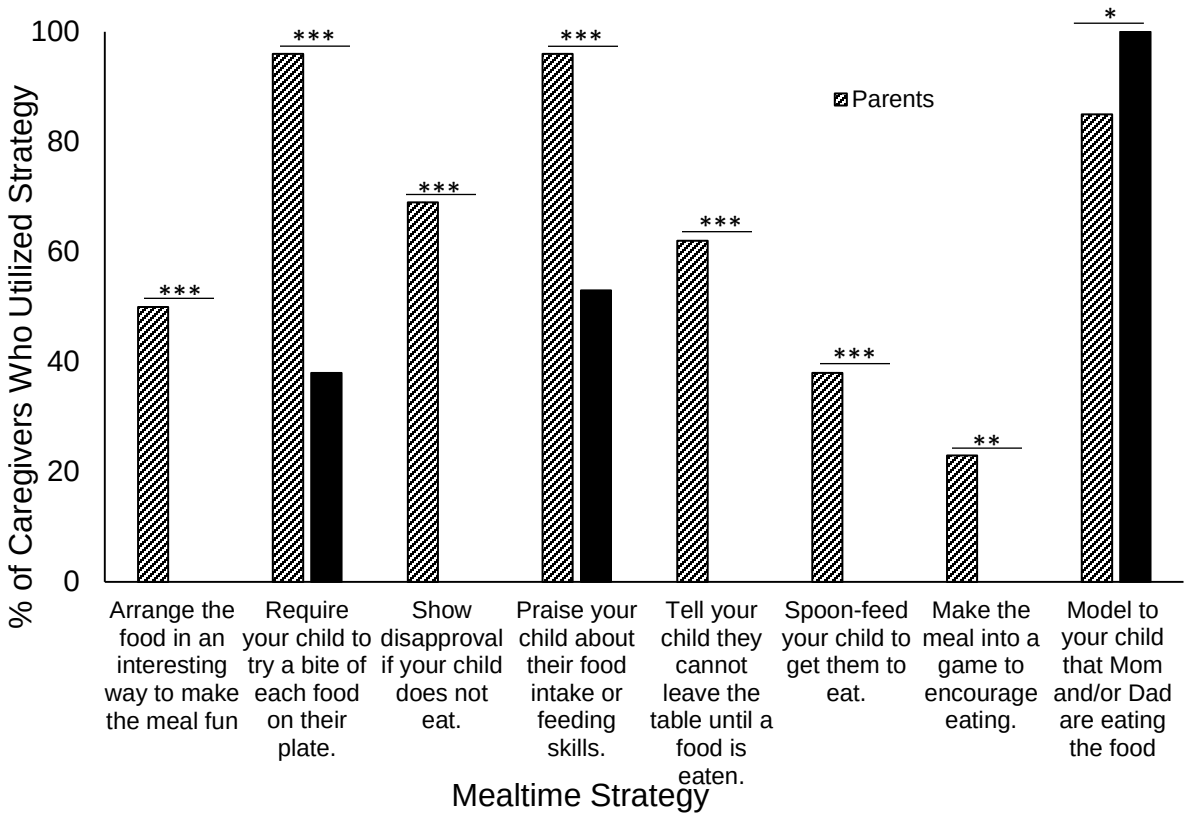
Data are presented as the average percent of parents or providers using that strategy. Statistical differences between groups are indicated as follows: ***$p \leq 0.001$.

Figure 3.4. Differences in Mealtime Strategy Utilization between Parents (n = 47) and HBCC Childcare Providers (n = 11).



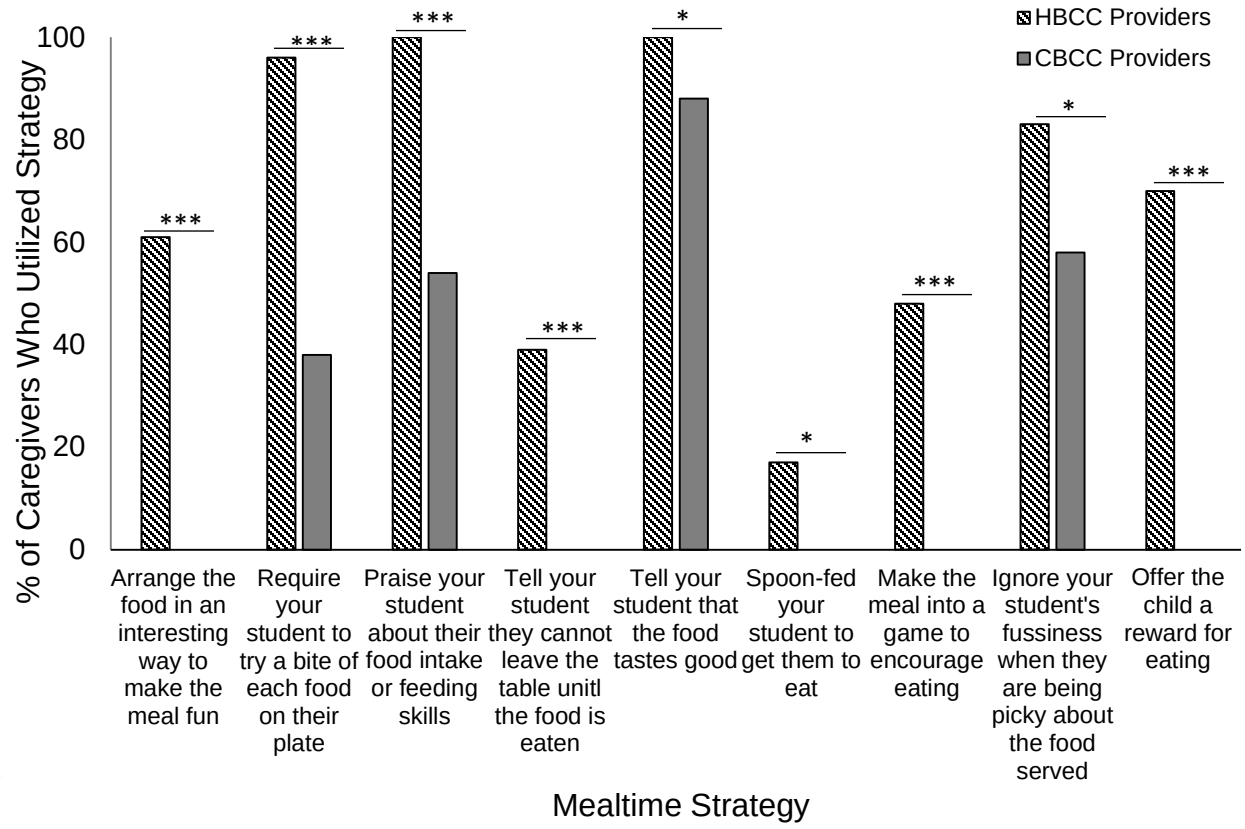
Data are presented as the average percent of parents or providers using that strategy. Statistical differences between groups are indicated as follows: *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$.

Figure 3.5: Differences in Mealtime Strategy Utilization between Center-based childcare (CBCC) Parents (n = 25) and CBCC Providers (n = 9).



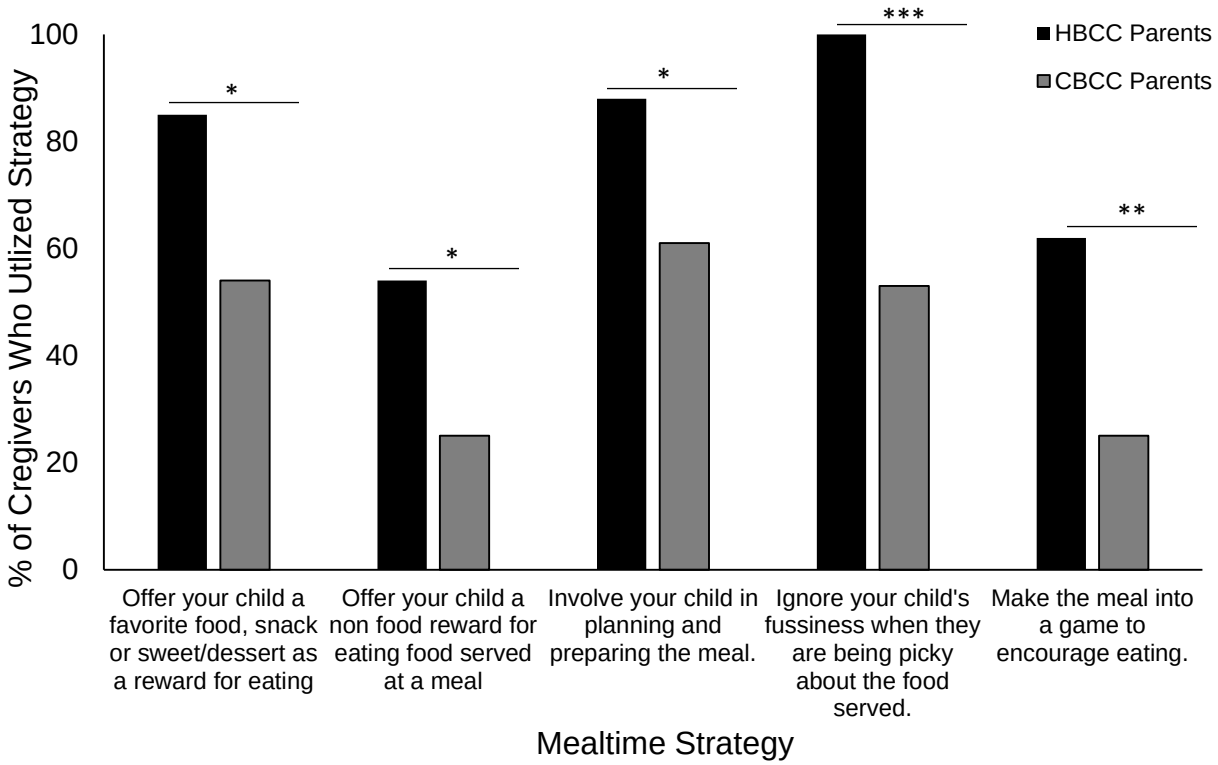
Data are presented as the average percent of parents or providers using that strategy. Statistical differences between groups are indicated as follows: $*p \leq 0.05$, $**p \leq 0.01$, $***p \leq 0.001$.

Figure 3.6. Differences in Mealtime Strategy Utilization between HBCC (n = 11) and CBCC providers (n = 9).



Data are presented as the average percent of parents or providers using that strategy. Statistical differences between groups are indicated as follows: $*p \leq 0.05$, $**p \leq 0.01$, $***p \leq 0.001$.

Figure 3.7. Differences in Mealtime Strategy Utilization between Parents Who Use HBCC (n = 22) and Parents Who Use CBCC (n = 25).



Data are presented as the average percent of parents or providers using that strategy. Statistical differences between groups are indicated as follows: *$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$.

CHAPTER 4
Differences and agreement in pickiness perception among center- and home-based childcare providers and parents and its impact on utilized mealtime strategies

4.1 Abstract

Picky eating is a problematic eating behavior caregivers may encounter with the children under their care. A picky eater (PE) is typically characterized as consuming a narrow range of food, as well as rejecting several food items. Much of the literature regarding PEs involves parents, although use of non-parental childcare arrangements in the U.S. has increased in the past several decades. While data on parental mealtime strategies exists, little is known about differences in parent or childcare provider pickiness perceptions differ between types of childcare such as center-based (CBCC) and home-based childcare (HBCC) or how these perceptions influence the mealtime strategies caregivers utilize. The objectives of this study were to: 1) compare perceptions of child pickiness between parents and childcare providers 2) compare pickiness agreement between the dyads of CBCC parents and providers and HBCC parents and providers, and 3) identify mealtime strategy utilization based on pickiness perception. Fifty-two child, parent and childcare provider triads participated in the study. Parents and childcare providers completed the Mealtime Assessment Survey and the Parent/Teacher Mealtime Strategy Survey regarding the same child. Parents are more likely than childcare providers to perceive a child to be picky, HBCC parents and providers agree more in their perception of child pickiness and are more likely to perceive a child as being picky than CBCC parents and providers, and finally that perception of child pickiness has a greater influence in the mealtime strategies being used by parents compared to the childcare providers. These results can be used to focus intervention efforts aimed at improving child eating habits across the home and childcare location.

Key words: picky eating, mealtime strategies, parent, childcare provider

4.2 Introduction

Children experience rapid changes in their diets during early childhood at a time that they are also forming their eating habits (Birch & Fisher, 1998). Eating behaviors are shaped in a variety of ways including: what food the child is introduced to, the environment in which the food is served, and way in which the food is prepared or typically consumed (Birch & Fisher, 1998; Birch, Marlin, & Rotter, 1984; Birch et al., 1987; Carruth et al., 2004; Skinner et al., 1998). Strategies that caregivers use during mealtimes to serve or encourage the child to eat can also affect their eating habits and behaviors (Kiefner-Burmeister et al., 2014).

Caregivers often report “picky” or “fussy” eating behaviors by the child. By the time children are two years old, 50% of parents have been reported to perceive their child as a picky eater (Carruth et al., 2004). Picky eaters (PEs) are typically characterized as consuming a narrow range of food, as well as rejecting several new and familiar food items (Dovey et al., 2008; Thompson et al., 2015). These behaviors can cause frustration, worry, or anxiety from the caregiver that the child isn’t consuming the appropriate nutrients needed for healthy growth (Cullen et al., 2000).

Though just a few decades ago children were mostly cared for by their parents, today more children are being cared for in non-parental child care arrangements. According to the US Census Bureau, 33% of children under age 5 are cared for in non-parental childcare arrangements for an average of 35 hours per week (Laughlin, 2013). The most popular form of non-parental childcare is center-based childcare (CBCC), encompassing 67% of children in non-parental childcare arrangements (Laughlin, 2013). Home-based childcare (HBCC) settings represent 30% of children in non-parental childcare arrangements (Laughlin, 2013).

Center-based childcare centers are a structured, “school-like” environment; typically they contain multiple classrooms comprised of children of similar ages separated in each classroom with a set teacher to student ratio. Center-based childcares are usually well regulated with policies the childcare must follow (American Academy of Pediatrics et al., 2002). Home-based childcares are environments where children are cared for in someone’s house. There are usually less children in HBCC than in CBCC and typically there is only one caregiver (National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network, 2000). Home-based childcares have more freedom in terms of policies that need to be followed depending on their licensing status or involvement in programs such as the Child and Adult Care Food Program (Kaphingst, French, & Story, 2006).

While children are being cared for in these locations, i.e., home and childcare, they usually consume at least one meal (Bollella et al., 1999). Consequently, children are exposed to different eating environments and potentially different feeding strategies. However, most of the literature in this field focuses on parental feeding strategies (Birch et al., 1982; Cullen et al., 2001; Fisher et al., 2002; Galloway et al., 2005; Patrick & Nicklas, 2005), leaving a gap that focuses on childcare mealtimes, including how mealtime strategies used at different childcare locations may be varied from those at home. In addition, there is a gap in the literature that addresses how perceptions of child eating behavior, specifically picky eating, differs between caregivers, if parents and childcare providers of the same child agree in their perceptions of child pickiness, and if pickiness perception has any impact on the mealtime strategies that are utilized. Therefore, the objectives of this study were to: 1) compare perceptions of child pickiness between parents and childcare providers, 2) compare pickiness agreement between the dyads of CBCC providers and parents and HBCC providers and parents, and 3) identify the differences in

the mealtime strategies utilized based on the differences in pickiness perceptions. It was hypothesized that perceptions of child pickiness would differ amongst caregivers. It was further hypothesized that HBCC and CBCC caregivers would not have the same level of agreement in pickiness perception. Lastly, it was hypothesized that that differing perceptions of child pickiness would impact the mealtime strategies that were utilized.

4.3 Methods

Participants

This study was approved by the Institutional Review Board at the University of Illinois. Parents and their families in the surrounding area of Champaign-Urbana were recruited through their child's childcare provider; 27 families and 7 center-based childcare providers were recruited from the Child Development Laboratory (a center-based childcare on the University of Illinois campus) and 25 families and 12 HBCC providers were recruited from home-based childcare centers in the area.

Participation requirements included having at least one child aged 3-5 years with no food allergies. The 3-5 year old age range for the study was determined based on the findings from previous literature that this age range is when picky eating behaviors peak (Cardona Cano et al., 2015; Carruth et al., 1998). If families had two children in the 3-5 year age range they could enroll both children if desired. Only one family from CBCC and one family from HBCC enrolled two children in the study, all others only enrolled one child. This resulted in 26 parents from CBCC enrolled and 24 parents from HBCC enrolled in the study. There were two HBCC providers that were also mothers of children participating in the study. These participants completed surveys from the perspective of the child's mother and the child's childcare provider

separately. All statistical tests were completed with the removal of these HBCC providers to identify if their responses skewed the results, and no result interpretations were changed. Therefore, their responses were included in the analysis.

Measures

Parents and teachers completed two surveys either on-line or in paper: the Mealtime Assessment Survey (MAS) and the Parent/Teacher Mealtime Strategies Survey (PMS/TMS). For all surveys, parents and childcare providers responded to questions using a 5-point Likert scale with Never, Rarely, Sometimes, Often or Always response options.

The MAS contained 34 items and assessed a child's typical mealtime behavior (**Table 4.1**). It was developed through a series of focus groups and conjoint analyses examining actions displayed by PE, NPE, and parents during feedings and adapted from questionnaires found in the literature regarding toddler mealtime behaviors (Baughcum et al., 2001; Boquin et al., 2014b; Harrison et al., 2011; Kauer, Rozin, & Pelchat, 2002; Musher-Eizenman & Holub, 2007). Parent and teacher perception of the child's pickiness was determined via the question "How often is your child/student a picky eater?" on the MAS. Responses were dichotomized to classify a child as PE (Always, Often, and Sometimes) or a non-picky eater (NPE) (Rarely and Never). This method of dichotomization is well accepted and has been reported previously in the literature (Boquin et al., 2014; Carruth et al., 2004; Jacobi, Schmitz, & Agras, 2008).

The PMS (**Table 4.2**) contained 22 items regarding mealtime strategy utilization (MacInnes, 2012). The TMS (Table 4.2) contained 18 questions. Questions on the TMS were the same to those on the PMS, though some questions were tailored for applicability to a childcare setting or were removed (MacInnes, 2012).

Statistical analysis

In order to test the first objective, the McNemar test was used to determine differences in pickiness perceptions (PE/NPE) between childcare providers and parents within each childcare setting. For more detailed analysis that accounted for the clustering of responses within childcare setting, a multinomial cumulative logit model was used to explore the association of childcare setting (CBCC vs. HBCC), caregiver type (parent vs. provider) and their interaction on pickiness perception as measured using the full 5-point categorical scale. The proportional odds assumption was confirmed using the Score test. The resulting beta coefficient is interpreted as the increase in the log odds of higher perceived pickiness rating associated with a one unit change in a covariate after holding all other covariates as constant. To obtain the Odds Ratio (OR) and the 95% Confidence Interval (95% CI) the exponent of the beta coefficient was determined.

In order to test the second objective, percent agreement in pickiness perception between parents and childcare providers was determined based on whether or not the caregivers (parent and childcare provider) perceived the same child as a PE. If the two caregivers perceived the same child as a PE their responses were recorded in the “agreed” category. Across childcare differences in percent agreement between parent-childcare provider pairs were compared using Chi-square test.

In order to test the third objective, the frequency of use of mealtime strategies by the parents and the childcare providers in response perception of child pickiness (PE/NPE) dichotomized as previously described was determined using Chi-square.

All statistical analyses were performed using Microsoft Excel (Version 15.0.4727.1000 Redmond, WA, USA) or Statistical Analysis Software (SAS) version 9.3 (SAS Institute, Cary,

NC, USA). A two-tailed, significance level of $p<0.05$ was considered statistically significant. No adjustment for multiple testing was performed.

4.4 Results

Fifty-two child, parent, and childcare provider triads participated in the study. There were approximately equal proportions of boys and girls (48% and 52%, respectively). Thirty-five percent of the children were 3 years old, 40% were 4 years old, and 25% were 5 years old. Most of the parents in the study were female, between the ages of 26-35, and Caucasian. All childcare providers, regardless of location, were female. Most childcare providers were between the ages of 46-55 and Caucasian. Income and education levels varied among caregivers. More detailed demographic information can be found in **Table 4.3**.

The results showed that 56% of CBCC parents and 44% of CBCC providers perceived their child or student as a PE, whereas 60% percent of HBCC parents and 52% of HBCC providers perceived their child or student as being a PE (**Figure 4.1**). Although these proportions were not statistically significant within each childcare setting, using a multinomial cumulative logit model the results showed that parents are about 1.4 times more likely than providers to rate the child as being more picky (always add OR and 95% CI following the summary sentence). In addition, HBCC parents and providers are 1.6-times more likely to rate a child as being picky than CBCC parents and providers (OR and 95% CI) (**Table 4.4**).

With regards to agreement in pickiness perception between HBCC and CBCC parents and childcare providers, the results show that parents and providers do not agree in their perception of the same child's pickiness, supporting our hypothesis. CBCC parent/provider pairs significantly disagreed more than HBCC parent/provider pairs; 41% of CBCC parent/provider

pairs did not have the same perception of child pickiness compared to 24% of HBCC parent/provider pairs ($p = 0.0103$) (**Table 4.5**).

When the association of mealtime strategy utilization with the child's pickiness perception was compared within CBCC parents who did perceive their child as a PE to those who did not, two strategies were found to be significantly different: "Withholding a favorite food, snack, or sweet/dessert as a consequence for not eating ($p = 0.04$)" and "Modeling to your child that mom and/or dad are eating the food so they should eat the food too ($p = 0.04$)" (**Figure 4.2**).

When assessing differences in mealtime strategy utilization based on pickiness perception of CBCC providers, no mealtime strategies were found to be significantly different when a CBCC provider perceived a child to be a PE versus when they did not. In other words, mealtime strategy utilization did not change, regardless of pickiness perception.

Three strategies were found to be significantly different between HBCC parents who perceive their child to be a PE versus those who do not: "Offer your child a favorite food, snack or sweet/dessert as a reward for eating" ($p = 0.008$), "Offer your child a non-food reward for eating food served at a meal" ($p = 0.03$), and "Make the meal into a game to encourage eating" ($p = 0.04$) (**Figure 4.3**).

One strategy was found to be different ($p = 0.04$) based on differing perceptions of child pickiness for HBCC providers: "do you spoon-feed your student to get them to eat" (**Figure 4.4**). As shown, HBCC providers were more likely to use this strategy when they perceived their student as a PE.

4.5 Discussion

Results showed that more parents rate their children as being PEs than childcare providers. Parents may rate children as being pickier for several reasons. It could be that parents are more sensitive to the child's eating behavior and are therefore more likely to perceive a child as being picky. Because most parents worry about their child's growth and in order to grow their child must eat, any indication of hesitance to eat from the child may result in that parent perceiving their child to be a PE (McDermott et al., 2008). On the contrary, childcare providers may not be as sensitive to their student's eating habits because they are caring for multiple children (Sigman-Grant et al., 2008) or focus on other objectives during mealtime (Ramsay et al., 2010).

Another theory as to why more parents than childcare providers rate their children as PEs is that children may, in fact, be more PEs with their parents at home than they are with their childcare providers at childcare (MacInnes, 2012). Children are most likely aware that at home other food is available if they do not prefer what is served to them, and therefore, may be more inclined to reject or avoid that food until they are given an item they do enjoy (Werle, Murphy, & Budd, 1993). Additionally, children may also be aware of their parent's sensitivity to their eating habits and may know that if they avoid or refuse an item for a long enough time, that they will receive a different food. At childcare, especially CBCC, these options likely do not exist (Sigman-Grant et al., 2008), therefore resulting in less PE behavior from the child.

It was also found that between CBCC and HBCC caregivers (both parents and childcare providers), HBCC caregivers are about 1.6 times more likely to rate a student as a PE. Due to the nature of HBCC, in that it is typically a neighbor or friend of the parents, these caregivers may have similar ways of thinking or may talk more about the child's eating habits, and therefore,

have a more similar perception of the child's pickiness than CBCC caregivers (Tovar et al., 2015). It could also be that because the HBCC environment is similar to the family home in that the child is cared for in the caregiver's residence and that there are not as many children as a typical CBCC, that children act more similar at mealtime between their HBCC location and their home than CBCC children.

Similarly, HBCC parents and childcare providers were found to agree significantly more with each other in their perception of child pickiness than CBCC parents and providers. HBCC caregivers may agree significantly more with each other than CBCC caregivers because the HBCC environment is usually more similar to the home environment (Tovar et al., 2015). This similarity in environment could result in comparable behavior from the child, or similar mealtime strategy utilization from the parent and childcare provider, resulting in more agreement in perceptions of child pickiness.

Regarding mealtime strategy utilization, CBCC parents with perceived PEs were more likely to utilize more of a variety of mealtime strategies than parents with perceived NPEs, including using food as a contingency factor and parental modeling. Previous research on mealtime strategies has found using food as a contingency factor to be a negative towards the child's preference for that food (Birch et al., 1982; Birch et al., 1984). On the contrary, parental modeling of positive eating behaviors has been shown to be effective in establishing healthy eating habits in children (Fisher et al., 2002; Galloway et al., 2005; Patrick & Nicklas, 2005). These results show that parental perception of child pickiness does impact mealtime strategy utilization in CBCC parents, confirming our hypothesis. Parents with perceived PEs may employ more mealtime strategies than parents of perceived NPEs in efforts to improve food consumption in their child.

Center-based childcare providers did not change how they utilized mealtime strategies, regardless of their perception of child pickiness. Strategies utilized by this group of caregivers were consistent, not only from student to student for the same childcare provider, but also across childcare providers. This may be due to the policies and procedures surrounding mealtime that have been put into place by the CBCC that providers must follow (Sigman-Grant et al., 2008).

As with CBCC parents, HBCC parents with perceived PEs were more likely to utilize all significantly different strategies, including rewards and making the meal into a game to encourage eating. The consensus on whether the strategies of using foods/non-foods as a reward for eating are beneficial are inconclusive (Moore, Tapper, & Murphy, 2007; Wardle et al., 2003), as some studies have shown these strategies to be negative in that the child can develop dislike for the food that is being used as a means to receive the reward (Birch et al., 1987; Fisher & Birch, 2000; Galloway et al., 2005), while others show that using rewards can be motivating to children (Lowe et al., 2004). The strategy of making a meal into a game to encourage eating may also be negative, because it distracts the child from focusing on the meal and their satiety cues (Chaput et al., 2011). Similar to CBCC parents, these results indicate that parent perception of child pickiness does have an effect on mealtime strategy utilization. Based on these results, HBCC parents with perceived PEs are more likely to utilize ineffective strategies at mealtime in attempts to improve child eating.

Home-based childcare providers with perceived PEs were found to utilize the strategy of spoon-feeding more than HBCC providers who did not perceive to have PEs. Children between the ages of 3-5 should have the ability to feed themselves, rendering this strategy inappropriate for age, but HBCC providers with perceived PEs may not have this knowledge, and therefore, employ this strategy (Nahikian-Nelms, 1997). Though only one strategy was found to be

different, these results indicate that pickiness perception does affect mealtime strategy utilization in HBCC providers.

4.6. Conclusion

The findings from this study provide insight to not only elucidate differences regarding pickiness perception between parents and childcare providers and how that impacts utilized mealtime strategies, but also further our understanding regarding differences in mealtime between home and childcare overall. The caregivers with perceived PEs, regardless of location, are more likely to use a variety of mealtime strategies, even potentially ineffective ones. These results can be shared with parents trying to decide which childcare to choose, be used as a basis for mealtime strategy interventions with parents and childcare providers, and aid educators when trying to create educational materials for parents or childcare providers on mealtimes.

The limitations to these findings are that although we now know that there are differences in pickiness perception among caregivers who care for the same child, we do not know the reason why. Without understanding why differences in perceptions exist, location-specific interventions cannot be effectively created. Therefore, future research should focus on determining why parents and childcare providers of the same child have differing perceptions of child pickiness in order to develop appropriate feeding strategy interventions for caregivers based on their location.

4.7 Tables and Figures

Table 4.1. Mealtime Assessment Survey (MAS) Questions*

How often does your child…
Put up a fight or refuse to come to the table when it is time for a meal (or snack)
Show signs of fear, nervousness, or strong anxiety before mealtime (or snack)
Look forward to eating and mealtime (or snack)
Cringe or make a negative face after seeing or eating certain foods
Cry or get upset after seeing or eating certain foods
Gag or has a physical reaction after seeing or eating certain foods (NOT related to food allergies)
Become disengaged/uninvolved while sitting at the table during mealtime (or snack)
Carefully inspect the majority of food before taking a bit (is suspicious of food)
Have something better to do than eating at mealtime (or snack)
Show signs of sadness or disappointment when food is not prepared/cooked in the "right way"
Eat foods in sequence during the main course (ex: all peas first, then all potatoes, etc)
Take a long time to finish a meal compared to everybody else
Finish all the food served on the plate
Refuse to open mouth when do not want to eat certain foods
Prefer to drink liquids instead of eat the food at mealtime (or snack)
Try new foods
Eat the same foods repeatedly
Eat from a narrow range of food (fewer than 10 different foods)
Eat foods from only one food group (ex: eats only from meat group, grains group, etc)
Eat foods that are considered "healthy"
Eat foods with something in them that cannot be seen (ex: filled foods like ravioli)
Eat foods that have touched each other on the plate
Eat foods that are mixed or that have complex ingredients (ex: casseroles, lasagna)
Eat foods with sauces on them (ex: pasta with tomato sauce, turkey with gravy)
Eat raw fruits and vegetables (NOT baked, steamed, etc.)
Eat foods that are "lumpy" (ex: sauce with pieces in it or stew)
Eat foods that are slippery or "slimy"
Eat foods that are hard, dry or crunchy
Eat foods that are smooth or pureed food with no detectable particles
Eat foods of only one particular color
Comment that food was not prepared or cooked right
Request to eat different food than what was served
Participate in mealtime conversation
How often is your child a picky eater?

*From: Boquin et al.2014a; Boquin et al., 2014b.
Parents and childcare providers completed one MAS per child enrolled.
Response types were "Never, Rarely, Sometimes, Often, Always" and later dichotomized to "Yes" (Sometimes, Often, Always) and "No"(Never, Rarely) categories.

Table 4.2. Parent (PMS) and Teacher Mealtime Strategy Survey (TMS) Questions*

1†	Offer your child a favorite food, snack or sweet/dessert as a reward for eating.
2†	Offer your child a non-food reward for eating food served at a meal.
3†	Withhold a favorite food, snack or sweet/dessert as a consequence for not eating.
4†	Involve your child in planning and preparing the meal.
5†	Make your child finish all of the meal before getting dessert.
6†	Make a different food for your child before the meal if they don't like what is being served.
7†	Make a different food for your child after the meal if they didn't eat the food that was served.
8†	Serve a combination of foods that are new and/or disliked with foods already preferred by your child.
9††	Arrange the food in an interesting way to make the meal fun.
10††	Teach your child about the food served at the meal.
11††	Require your child to try a bite of each food on their plate.
12††	Show disapproval if your child does not eat.
13††	Allow your child to choose the foods they want to eat from the food that is served.
14††	Praise your child about their food intake or feeding skills.
15††	Tell your child they cannot leave the table until a food is eaten.
16††	Spoon-feed your child to get them to eat.
17††	Encourage your child to try new foods.
18††	Allow your child to eat what and how much they want at the majority of meals.
19††	Make the meal into a game to encourage eating.
20††	Model to your child that Mom and/or Dad (or teacher) are eating the food so they should eat the food too.
21††	Ignore your child's fussiness when they are being picky about the food served.
22††	Do not need to use any strategies to get my child to eat at mealtime.
23†††	Tell the child they have to try a bite of everything before getting seconds.
24†††	Tell your child that the food tastes good.
25†††	Withhold something as a consequence for not eating.
28†††	Offer the child a reward for eating

* From: MacInnes A. Influence of parenting style and environment on perception of picky eating behaviors in toddlers. Thesis Dissertation, University of Illinois at Urbana-Champaign. 2012. Parents completed one PMS per child enrolled. Childcare providers completed one TMS per child enrolled. Response types were "Never, Rarely, Sometimes, Often, Always" and later dichotomized to "Yes" (Sometimes, Often, Always) and "No"(Never, Rarely) categories,

† Strategies only used by the parents at home.

†† Strategies used both by both parents and teachers at home and childcare setting.

††† Strategies used by childcare providers in a childcare setting.

Table 4.3. Participant Demographic Information (% total)

	Parents			Providers	
	Child (n = 52)	CBCC (n = 26)	HBCC (n = 24)	CBCC (n = 7)	HBCC (n = 12)
Gender					
Male	48	35	21		
Female	52	65	79	100	100
Age (years)					
3	35				
4	40				
5	25				
18-25		7	17		8
26-35		50	42	14	16
36-45		35	42	14	8
46-55		7		43	50
56-65				29	17
Marital Status					
Single		15	42	71	33
Married		81	58	29	66
Not indicated		4			
Race/Ethnicity					
Caucasian		38	83	43	58
African American		11	13		25
Asian		46			
Hispanic		4		29	
Other			4		16
Not indicated				28	
Education Level					
High school graduate			8	14	17
Technical school			4		
Some college		19	21	14	42
Bachelor degree		8	38	71	17
Graduate degree		69	28		17

Table 4.3, continued

Not indicated	4			7
Income				
Under $25,000	19	17	29	17
$25,000 - $34,999	19	13	43	8
$35,000 - $49,999	4	8		17
$50,000 - $74,999	12	17		8
$75,000 - $99,999		33	14	17
$100, 000 and over	42	8		8

Abbreviations: CBCC, Center-based childcare; HBCC, Home-based childcare

Table 4.4. Multinomial Cumulative Logit regression model for the association of childcare type and caregiver with the outcome of increasing child pickiness perception.

Variable	***B coefficient***	***Standard Error***	***OR (95% CI)***
Site (HBCC vs. CBCC)	0.489	0.0716	1.6 (1.5 – 1.8)
Caregiver (parent vs. provider)	0.353	0.0403	1.4 (1.3 – 1.5)

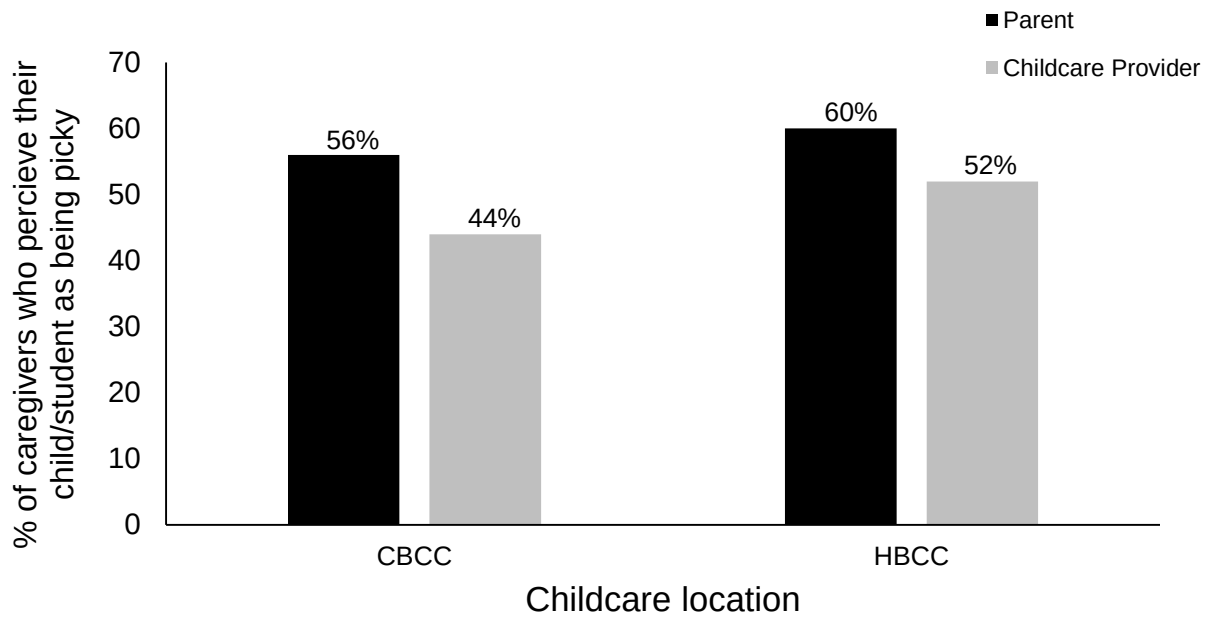
OR of 1.6 for Site indicates that HBCC parents and providers are 1.6 times more likely to perceive a child as being a PE. OR of 1.4 for Caregiver indicates that parents are 1.4 times more likely than childcare providers to perceive a child as being a PE.

Table 4.5. Percent agreement of perceived child pickiness between parents and childcare providers

Caregiver Pairs	Did Not Agree (%)*	Agreed (%)
CBCC Parents and Teachers	41	59
HBCC Parents and Teachers	24	76

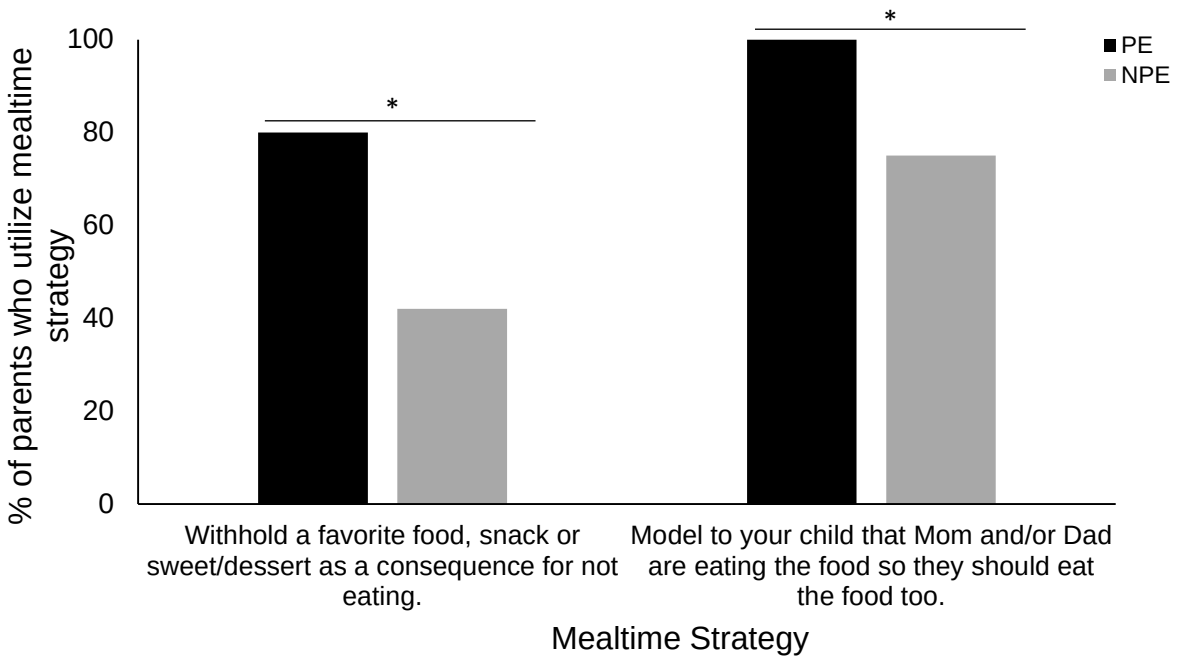
* Significant at $p \leq 0.05$ using Chi-square. Forty-one percent of CBCC parents and teachers did not agree in their perception of the same child's pickiness as opposed to 24% percent of HBCC providers and parents not agreeing.

Figure 4.1. Differences in percent of caregivers who perceive the child as being a PE between CBCC Provider (n = 7) and Parents (n = 26) and HBCC Providers (n = 12) and Parents (n = 24).



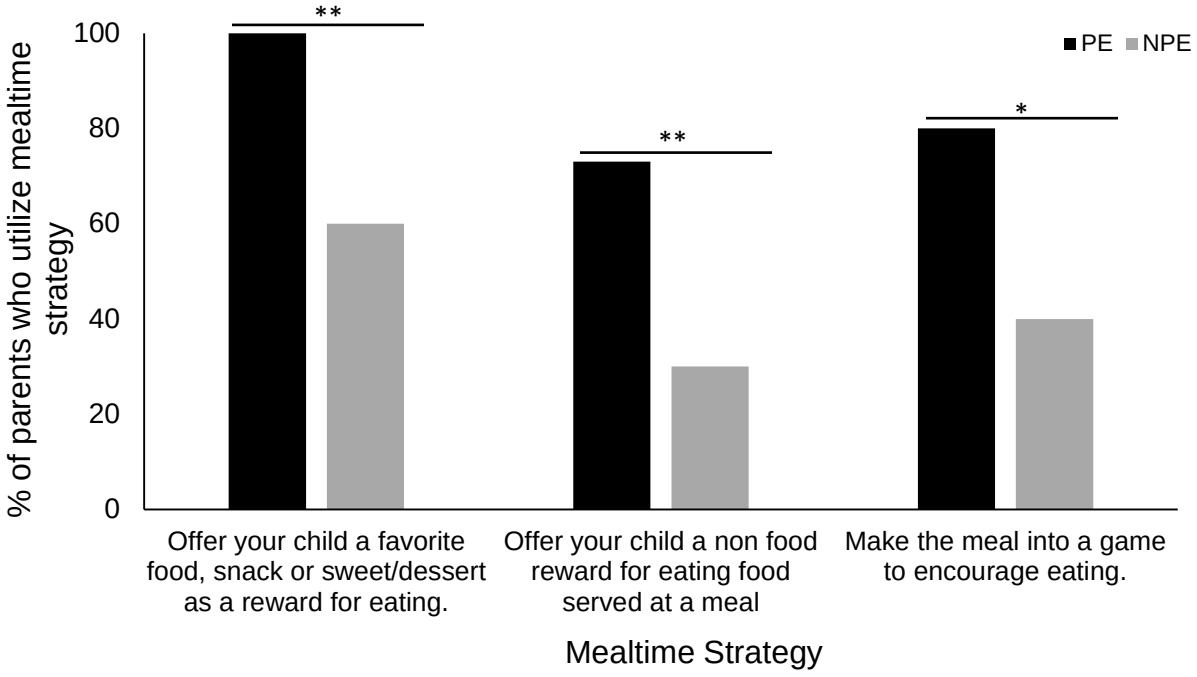
Proportions not significantly different within each childcare setting.
Abbreviations: CBCC, Center-based childcare; HBCC, Home-based childcare; PE, picky eater.

Figure 4.2. Association of mealtime strategies with child's pickiness perception (PE (n = 15) and NPE (n = 12)) among CBCC parents.



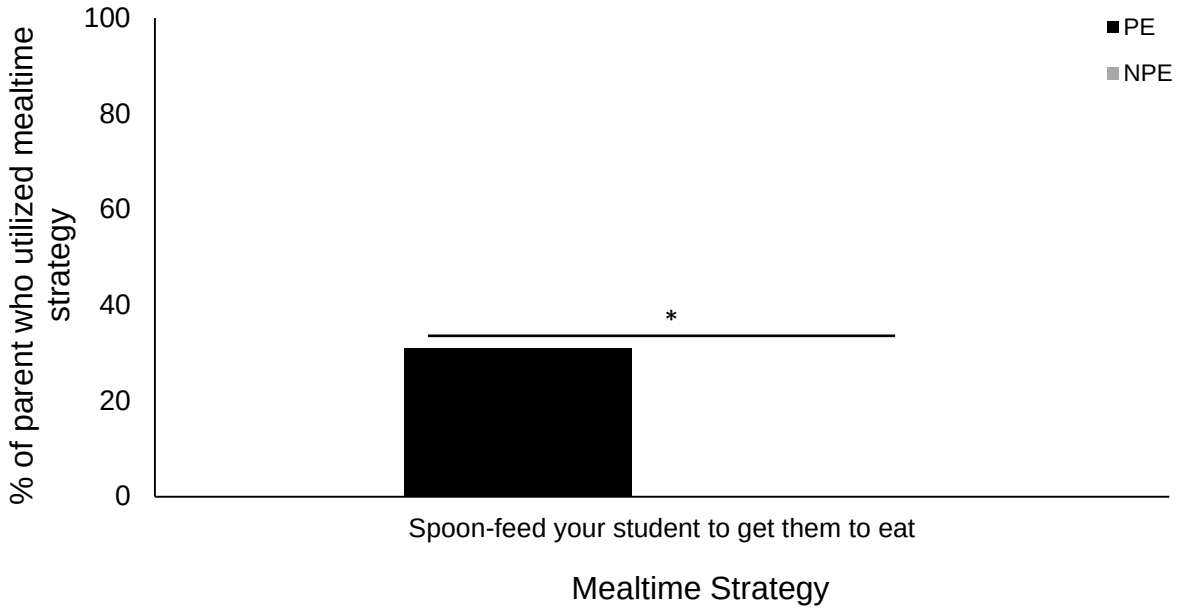
*$p \leq 0.05$. Significance according to Chi-square test. Parents who perceived the child as a PE used both mealtime strategies more often than those who perceived the child as a NPE. Abbreviations: CBCC, Center-based childcare; PE, picky eater; NPE, non-picky eater.

Figure 4.3. Association of mealtime strategies with child's pickiness perception (PE (n = 15) and NPE (n = 10)) among HBCC parents.



*$p \leq 0.05$, ** $p \leq 0.01$ Significance according to Chi-square test. Parents who perceived the child as a PE used all mealtime strategies more often than those who perceived the child as a NPE. Abbreviations: HBCC, Home-based childcare; PE, picky eater; NPE, non-picky eater.

Figure 4.4. Association of mealtime strategies with child's pickiness perception (PE (n = 13 and NPE (n = 12)) among HBCC providers.



*p ≤ 0.05, ** p ≤ 0.01. Significance according to Chi-square test. Parents who perceived the child as a PE used all mealtime strategies more often than those who perceived the child as a NPE. Abbreviations: HBCC, Home-based childcare; PE, picky eater; NPE, non-picky eater.

CHAPTER 5
Observed and Reported Differences in Child Picky Eating Behavior between Home and Childcare Locations

5.1 Abstract

Picky eating (PE) is a common mealtime difficulty that is reported by up to 50% of caregivers. Most of the research to date on PE has focused on parents, even though millions of children also eat meals in home- or center-based childcare settings. Currently, little is known about PE behaviors manifested by the child across the home and childcare settings, or how these behaviors differ between home-based childcare (HBCC) and center-based childcare (CBCC) locations. The objectives of this study were to 1) compare PE behaviors between the child's home and HBCC or CBCC environments, 2) compare PE behaviors between HBCC and CBCC environments, and 3) correlate observed to reported PE behaviors. Children, ages 3-5 years, were recruited from CBCC (n=26) or HBCC (n=24) locations. Caregivers completed the Mealtime Assessment Survey (MAS) that identified children's typical mealtime behaviors and children were videotaped consuming two different lunchtime meals in their home and childcare. Picky eating behaviors were coded from the videos and correlated to reported behaviors on the MAS. Results showed that children in CBCC displayed more PE behaviors when at home than at childcare, while HBCC children displayed PE behaviors more similarly between the two locations. In addition, two significant correlations were found between observed and reported PE behaviors for HBCC providers, one for CBCC providers, one for CBCC parents, and none for HBCC parents. Thus, interventions to reduce PE behaviors should be personalized for location-specific intervention programs focused on raising healthy eaters across multiple locations.

Keywords: picky eating, family mealtime, childcare mealtime, child eating behavior

5.2 Introduction

Food preferences are formed early in life and tend to persist into adulthood, making childhood an important time to support the development of healthy eating habits (Birch, Savage, & Ventura, 2007; Blissett, 2011; Neelon & Briley, 2011). A variety of factors influence the formation of food preferences, including genetics (L. L. Birch, 1999), food availability and exposure (Hearn et al., 1998; Wardle, Herrera, Cooke, & Gibson, 2003), caregiver feeding styles (Hubbs-Tait et al., 2008; Patrick & Nicklas, 2005), and the mealtime environment (Birch & Fisher, 1998).

A common barrier to the formulation of healthy eating habit is a child's picky eating (PE) behavior (Carruth et al., 2004). Picky eating is often classified as having low dietary variety and rejecting both familiar and unfamiliar foods (Carruth et al., 1998a; Carruth et al., 2004; Dovey et al., 2008). Picky eating behaviors have been linked to depression (Zucker et al., 2015), increased risk for developing an eating disorder (Marchi & Cohen, 1990), underweight (Dubois et al., 2007), and parental concern about the child's growth (Cullen, Baranowski, Rittenberry, & Olvera, 2000).

Much of the existing literature on PE involves parents even though millions of children also eat meals at childcare in the presence of their childcare provider. It is estimated that 33% of children spend an average of 35 hours per week at childcare where they can consume up to one half of their daily nutrient needs (Dev, McBride, & STRONG Kids Research Team, 2013; Larson et al., 2011; Laughlin, 2013). This makes the childcare setting a prominent influencer in childhood eating habit formation.

The most common type of non-parental childcare is center-based childcare (CBCC), which is attended by 67% of children in non-parental childcare arrangements (Laughlin, 2013).

Center-based childcare centers are a structured, “school-like” environment; typically they contain multiple classrooms comprised of children of similar ages separated in each classroom with a set teacher to student ratio. Center-based childcares are usually well regulated with policies the childcare must follow (American Academy of Pediatrics et al., 2002).

Home-based childcare (HBCC) are environments where children are cared for in someone’s house and encompass around 30% of children in non-parental childcare arrangements (Laughlin, 2013). There are usually fewer children in HBCC than in CBCC and typically there is only one caregiver (National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network, 2000). Home-based childcares have more freedom in terms of policies that need to be followed depending on their licensing status or involvement in programs such as the Child and Adult Care Food Program (Kaphingst, French, & Story, 2006).

While millions of children consume meals at childcare and at home, to our knowledge no studies have investigated how child mealtime behavior differs between these environments. Anecdotally, it is common for parents to report that children are pickier at home than at childcare (MacInnes, 2012; Meeker, 2012), but no scientific studies have confirmed this. Additionally, even though 1/3 of children in childcare attend HBCC, most studies focus on CBCC, leaving a gap in the literature addressing HBCC and comparisons of children’s PE behavior between the two settings. Further, to our knowledge no studies have correlated observed child PE behavior across the home and childcare settings to behaviors caregivers report on surveys.

Therefore, the objectives of this study were to 1) compare PE behaviors between the child’s home and center- or home-based childcare environment, 2) compare PE behaviors between children who attend HBCC versus those who attend CBCC and 3) correlate observed to reported PE behaviors. It was hypothesized that children would express more PE behaviors in

their home than in their childcare environment and that HBCC children would be pickier at HBCC than CBCC children would be at CBCC. Further, it was hypothesized that observed and reported behaviors would be significantly correlated.

5.3 Methods

Participants

Center- and home-based childcare providers in the Champaign-Urbana area were contacted via phone call, community group meetings, or flyers to participate in the study. Three classrooms from the CBCC on the University of Illinois campus and twelve HBCC centers were recruited. Parents utilizing these childcare centers were then invited to participate in the study. All materials and methods were approved by the University of Illinois Institutional Review Board.

A total of 50 child-parent pairs were recruited, 26 from CBCC and 24 from HBCC. Participation requirements included having at least one child aged 3-5 years with no food allergies. The 3-5 year old age range was selected based on previous literature indicating that picky eating behaviors peak during this age range (Cardona Cano et al., 2015; Carruth et al., 1998b). If parents had two children meeting the inclusion criteria, both children could be enrolled in the study, if desired. Only one single-parent household from CBCC and HBCC included two children, resulting in 26 children and 25 parents from CBCC and 24 children and 23 parents from HBCC.

Observations

Children were observed consuming lunch in their home and childcare location. To control for changes in behavior due to differences in food, food at every meal and for everyone

present at the meal was kept constant. Children were observed four times, twice at home consuming a “non-popular” meal and a “popular” meal, and twice at childcare consuming the same “non-popular” and “popular” meals. This resulted in a total of 200 mealtime observations. The “non-popular” meal consisted of a whole wheat sandwich with turkey and cheese, fresh broccoli, ranch dressing, and grapes (**Figure 1a**). The “popular” meal consisted of grilled chicken strips, tortilla chips with salsa, and a banana (**Figure 1b**). Non-popular and popular menus were created based on previous literature reporting typical toddler food preference and consumption patterns (Boquin et al., 2014b; Fox et al., 2004; MacInnes, 2012).

Due to the recruitment method of the study in that parents and children were recruited from the childcare providers, the first contact for the meals during the observations was in almost all cases at childcare. However, the average duration between observations at childcare and the family home was 30 days. This ensured that observations between locations were not too close together, which prevented potential changes in mealtime behavior due to participant fatigue of the food being provided during the observations.

Mealtimes were recorded using video cameras discreetly placed in the meal environment. Upon arrival at the mealtime location researchers would set up the cameras, leave the house/school, and return once the meal was over. This was done to minimize alterations in behavior in participants due to the presence of researchers. After the meal was complete caregivers were asked to rate how typical the meal was. Atypical meals were rescheduled until a typical meal was captured on camera.

Coding

In order to capture PE behaviors from the videos, a codebook (**Table 1**) was created using previously reported methods (Klesges et al., 1983; MacInnes, 2012; Orrell-Valente et al.,

2007). Four behaviors were included in the codebook to quantify the essence of PE behaviors: physical food refusals and avoidances and verbal food refusals and avoidances (Sanders et al., 1993). Research assistants were trained until they reached an inter-rater reliability of Cohen's Kappa of > 0.90. Once research assistants were trained, videos were coded using the coding software Dedoose (Version 7, SocioCultural Research Consultants, LLC, CA). To avoid coder drift, 20% of videos were also coded by the master coder (Edelson, Mokdad, & Martin, 2016). Any questions that arose between coders about coded excerpts were resolved by the lead coder

Surveys

Parents and childcare providers completed the Mealtime Assessment Survey (MAS) (Boquin et al., 2014b). The MAS contained 34 items and assessed a child's typical mealtime behavior. It was developed through a series of focus groups and conjoint analyses examining actions displayed by picky eaters, non-picky eaters, and parents during feedings and adapted from questionnaires found in the literature regarding toddler mealtime behaviors (Baughcum et al., 2001; Boquin et al., 2014b; Harrison et al., 2011; Kauer, Rozin, & Pelchat, 2002; Musher-Eizenman & Holub, 2007). Response options on a 1 to 5 scale were "Never, Rarely, Sometimes, Often, Always." Questions on the MAS that most closely matched the behaviors coded from the videos were used for correlation analysis (**Table 5.1**).

Data Analysis

The frequency of physical and verbal refusals and avoidances were aggregated for each location and meal type. Proportions of behavior between each location and meal type were compared using the McNemar test for paired binary data. For comparison between CBCC and HBCC, a two-way Chi-square test was used. Two-tailed Spearman's rank correlation test was used to calculate correlation between observed behaviors at mealtime and reported behaviors on

the MAS. Statistical tests were completed using Statistical Analysis Software (SAS) version 9.4 (SAS Institute, Cary, NC, USA) or Excel (Version 15.0.4727.1000 Redmond, WA, USA). Significance was set to $p \leq 0.05$.

5.4 Results

Demographics: Nine CBCC providers and 12 HBCC providers were recruited from the Champaign-Urbana area to participate in the study. Fifty children were then recruited from the enrolled childcare locations; 26 from CBCC and 24 from HBCC. Child sex was spilt evenly between boys and girls for both locations. There was also a comparable number of children in all three age groups for both locations.

Parents choosing CBCC were more educated, had higher income, and a greater majority were of Asian ethnicity than HBCC parents. All childcare providers, regardless of location, were female. Most childcare providers were between the ages of 46-55 years and Caucasian. Providers at CBCC were more educated than HBCC providers. More detailed demographic information on all participant demographics can be found in **Table 5.2**.

Total observed PE behaviors between the home and childcare locations: When all coded PE behaviors were combined by meal type and location, results showed that CBCC children expressed significantly more PE behaviors at home than at childcare for both the popular and non-popular meals ($p<0.001$) (**Figure 5.2**). For the popular meal, CBCC children expressed a total of 101 PE behaviors: 12% (n=12) of observed PE at CBCC and 88% (n=89) at home. For the non-popular meal CBCC children expressed a total of 299 PE behaviors: 78% (n=233) of PE behaviors at home and only 22% (n=66) at childcare.

Children attending in HBCC expressed significantly more PE behaviors at home than at childcare for the popular meal, but significantly more PE behaviors at HBCC for the non-popular meal ($p<0.001$) (**Figure 5.3**). Children in HBCC expressed a total of 135 PE behaviors during the popular meal: 64% (n=87) of observed PE behaviors were seen at home, compared to 36% (n=48) at HBCC. For the non-popular meal, HBCC children expressed a total of 370 PE behaviors: 32% (n=118) of observed PE behaviors were seen at home while 68% (n=252) were seen at HBCC.

In the CBCC location, our hypothesis that children would express more PE behaviors at home than at childcare was supported for both meals. In the HBCC location, our hypothesis for the popular meal was proven correct, but not the non-popular meal. In order to explore differences in frequency for specific PE behaviors, such as physical refusals and verbal avoidances between home and childcare, the following analyses were completed.

Observed PE behavior between home and childcare locations: When PE behaviors were separated and analyzed results show that CBCC children expressed every physical and verbal refusal and avoidance significantly more at home than at childcare for both the popular and non-popular meals, with the exception of verbal avoidance for the non-popular meal (**Figure 5.4**). During the popular meal, CBCC children were observed to express 2.21 times more physical refusals (OR = 2.21, 95% CI = 1.40 – 3.49) (p-value = <0.001), 2.89 times more verbal refusals (OR = 2.89, 95% CI = 1.97 – 4.25) (p-value = <0.001), 1.65 times more physical avoidances (OR = 1.65, 95% CI = 1.05 – 2.60) (p-value = 0.03), and 1.19 times more verbal avoidances at home than childcare (OR = 1.19, 95% CI = 1.05 – 1.35) (p-value = 0.007) (**Table 5.3**). During the non-popular meal, CBCC children were observed to express 3.06 times more physical refusals (OR = 3.06, 95% CI = 1.89 – 4.95) (p-value = <0.001), 4.53 more verbal refusals (OR =

4.53, 95% CI = 2.81 – 7.28) (p-value = <0.001), and 1.79 (OR = 1.79, 95% CI = 1.18 – 2.73) (p-value = 0.007) times more physical avoidances at home than at childcare.

In contrast to CBCC children, HBCC children behaved more similarly between their home and childcare locations for most PE behaviors. Interestingly, children in HBCC were observed to express significantly more physical avoidances for both the popular and non-popular meals at HBCC than at home (**Figure 5.5**). HBCC were observed to express half as many physical avoidances for the popular meal (OR = 0.519, 95% CI = 0.275 – 0.981) (p-value = 0.04) at home than at childcare and less than a quarter as many physical avoidances during the non-popular meal (OR = 0.160, 95% CI = 0.076 – 0.316) (p-value < 0.001) at home than childcare, opposite of CBCC children (**Table 5.4**). Though there were greater frequency of PE behaviors at home than at HBCC for the other behaviors, none of them were significant.

Observed PE behavior between children who attend CBCC versus HBCC: Picky eating behavior was also compared between the two types of childcare settings. Home-based childcare children expressed significantly more physical refusals during the non-popular meal ($p<0.01$), significantly more verbal refusals for the non-popular meal ($p<0.001$), physical avoidances for the popular ($p<0.001$) and non-popular meal ($p<0.001$), and significantly more verbal avoidances for the popular meal ($p<0.001$) than children at CBCC (**Figure 5.6**). There was no significant difference in physical refusals during the popular meal, verbal refusals during the popular meal, and verbal avoidances during the non-popular meal between HBCC and CBCC children.

Correlation between observed and reported PE behaviors – CBCC parents: Physical refusal was significantly correlated between observed behavior in CBCC family homes and behavior CBCC parents reported on the MAS ($r = 0.53$; $p = 0.005$) (**Table 5.5**). The other three PE behaviors also had positive correlations, though none of them significant.

Correlation between observed and reported PE behaviors – CBCC providers: Verbal avoidance was found to be significantly correlated between observed behavior at CBCC and behavior CBCC providers reported on the MAS ($r = 0.49$; $p = 0.01$) (Table 5.5), suggesting high congruency between what was observed and what CBCC providers reported for this PE behavior. No significant correlations were found for the other PE behaviors.

Correlation between observed and reported PE behaviors – HBCC parents: No strategies were found to be significantly correlated between what was observed and what HBCC parents reported, indicating high incongruence between HBCC parent report of child mealtime behavior and what was observed.

Correlation between observed and reported PE behaviors – HBCC providers: In contrast to HBCC parents, two significantly positive correlations were found between observed behavior at HBCC and behavior HBCC providers reported on the MAS: verbal refusal ($r = 0.55$; $p = 0.005$) and physical refusal ($r = 0.76$; $p<0.001$) (Table 5.5). Therefore, for these PE behaviors there was strong congruency between what was observed and what was reported. Physical avoidance was also positively correlated, but non-significant.

5.5 Discussion

Results show that within the CBCC location, children were observed to express more PE behaviors at home than at childcare, supporting our hypothesis. Children in CBCC may manifest more PE behaviors at home than at childcare for several reasons. Typically there are no other food options at CBCC if the child does not like what is being served at mealtime (Sigman-Grant, Christiansen, Branen, Fletcher, & Johnson, 2008). Therefore, whether the child displays picky behaviors or not, their behavior does not achieve what they want. Furthermore, CBCC providers

typically cannot cater to a child's dislike for certain foods and may be limited in what mealtime strategies they can use based on policies or procedures of the center in which they work (American Academy of Pediatrics et al., 2002). In contrast, parents are free to use any mealtime strategies they feel are appropriate, in addition to other food options being available to the children, so the children ask for other foods (Oliveria et al., 1992). Differences in the mealtime strategies between the child's parents and childcare providers and food availability may also play a role in the differences in observed behavior.

Moreover, the home environment may be where children are the most comfortable or where they feel that their actions can make a difference in the outcome they hope to achieve. Even young children are aware of the rules, expectations, and limitations that their childcare center has with regards to mealtime (Wiltz & Klein, 2001), and because they are aware of the differences in mealtime rules between home and childcare locations, their behaviors differ as well.

Within the HBCC location, children were found to express PE behaviors more equally between their home and childcare. This may be because HBCC is unique in that it has components of both the family home and CBCC. On one hand, HBCC's are nested within the caregiver's house and are typically less tightly regulated than CBCC, depending on their licensing status or involvement in programs such as the Child and Adult Care Food Program (Kaphingst et al., 2006). These are elements that are more similar to a family home. On the other hand, HBCC is a separate environment than the child's home led by a different caregiver who may or may not have similar expectations and rules as the child's family. These elements are more similar to CBCC. It may be that because HBCC is similar to the home environment that

children feel more comfortable and are more likely to express PE behaviors at this type childcare setting than CBCC children are to express in a CBCC location.

When observed PE behaviors were compared between children who attended CBCC and those who attended HBCC, those in HBCC expressed PE behaviors more frequently than at CBCC, confirming our hypothesis. As noted earlier, similarities between HBCC and the family home could result in HBCC children exhibiting more PE behaviors in the child care setting than CBCC children.

These results also highlight the differences in behavior observed when children were served the different meals: popular or non-popular. In both childcare locations it was evident that the non-popular meal was, in fact, less popular, as more PE behaviors were observed during this meal than the popular meal. The meals were created based on previous research indicating which foods are typically preferred by children in this age-range, and based on this study, supported via direct observation.

All correlations between observed and reported behavior on the MAS that CBCC parents completed were positive. This finding indicates that as the frequency of observed physical refusals in CBCC family homes increased, so did parental report of the occurrence of physical refusals. In other words, there was congruency between the physical refusals that were observed at mealtime and parental report of physical refusals on the MAS. Of these positive correlations, physical refusal was found to be significant, confirming our hypothesis. This may be because physical refusal is a very direct, obvious, and typically negative form of expressing dislike, making congruency between what was observed and parental report of the behavior on the MAS more likely to obtain. Additionally, CBCC parents may be particularly sensitive to this behavior due to the expectations and limitation of the child's CBCC. At CBCC, children are expected to

follow the rules and policies of the childcare center, even if they do not want to. When children are home however, rules are typically more flexible. This change in freedom may cause children to be additionally expressive at home and the parents notice, resulting in significant correlation between observed and reported physical refusals. Because we were only able to observe children during two meals in each location, it is possible that with more observations the other PE behaviors that we coded for would also be significant.

Correlational analysis between observed and reported behavior on the MAS that CBCC providers completed revealed verbal avoidance as a significant positive correlation. Verbal avoidances, as defined by the codebook, are indirect expressions of dislike. While the child may not directly refuse the food, they ask to eat something else. Because at CBCC there are typically are no other options for food other than what is being served, it would be odd for a child to ask to eat something else. Due to its rarity, it could be that CBCC providers could easily identify which child would be likely to verbally avoid a food item, resulting in high congruency between what was observed and what was reported on the MAS.

Contrast to CBCC caregivers, no significant correlations were found between observed and reported behavior on the MAS that HBCC parents completed. While some behaviors were found to have non-significant positive correlations which would support our hypothesis, others were found to have negative correlations. There could be incongruence with this group of parents for several reasons. First, significant correlations between observed versus reported data are commonly reported in the literature (Bernard, Killworth, Kronenfeld, & Sailer, 1984; Burton, 1970). Surprisingly, it is difficult for study participants to accurately report what is actually observed. Therefore, not finding significance between reported and observed behaviors is the common finding. Second, HBCC children were pickier at home for some behaviors, but not for

others. Because HBCC children weren't as picky at home it is possible that HBCC parents had a more difficult time accurately identifying how often children were being picky eaters at home.

All correlations between observed and reported behavior on the MAS that HBCC providers completed were positive. Additionally, two of the four PE behaviors were also significant, indicating high congruency between what was observed and what was reported. Because HBCC are typically comprised of a small group of children and because children in these settings are fed multiple times during the day, these providers may be especially in-tune with how children behave at mealtime which therefore results in high congruency between observed and reported behavior.

5.6 Conclusion

The findings of this study add important findings to the knowledgebase regarding child mealtime behavior. Results showed that children behave differently at mealtime between their home and childcare location, despite consuming the same food. In addition, when comparing HBCC to CBCC mealtimes, HBCC children express more PE behavior at HBCC than CBCC children. Lastly, while positive correlations between reported and observed behaviors were reported for parents, CBCC, and HBCC providers, the HBCC providers showed the most congruency between what was observed and what they reported. These results can be used for the creation of location-specific intervention or education programs with the intention of raising healthy eaters across multiple locations.

This study adds valuable insight into differences in children's mealtime behavior and how caregivers report it. Though there are strengths to this study, there are also limitations. One limitation is that due to our recruitment method, we were unable to randomize which location

children were first exposed to the meal. In our study, almost all of the children were exposed to the meals at childcare first. However, much of the literature states that exposure to food improves acceptance (Cooke, 2007; Sullivan & Birch, 1994; Wardle et al., 2003; Wardle et al., 2003). Therefore, if the location where children were first exposed to the meal impacted results, children should have consistently displayed more PE behaviors at childcare, instead of displaying more PE at home.

Second, the classrooms for our CBCC came from the same CBCC on the University of Illinois campus. Though we only recruited one CBCC, the classrooms within the center varied in child age, caregiver teaching style, and learning objectives. Future studies can focus on recruiting different types of CBCC for further analysis.

Separately, in this study we did not code for other factors within these different environments that could have affected mealtime behavior, such as peers or siblings present at the meal, if there were distractions at the meal such as the TV or other electronics, whether the caregivers sat with the children at the meal, etc. It would be beneficial for future studies to further explore components of the mealtime environment and assess their impact on PE behavior. In addition, future studies should focus on identifying what strategies caregivers use in response to child PE behavior in order to determine the most effective/ineffective mealtime strategies at managing PE behavior in different settings.

5.7 Tables and Figures

Table 5.1. Observed mealtime behavior definitions, examples from codebook, and reported behaviors on Mealtime Assessment Survey (MAS) used for correlational analysis (Boquin et al. 2014a; Boquin et al., 2014b).

Observed Behaviors	**Examples from Codebook for Observed PE Behaviors**	**Reported Behaviors from MAS: "How often does your child/student…"**
Verbal Refusal – *Aggressive, direct verbal indications of dislike or disapproval*	"I don't want the grapes" or the child whines in protest when sees food	Cry or get upset after seeing of eating certain foods
Verbal Avoidance – *Passive verbal comments that result in the child not having to consume the food. No direct indication of dislike or disapproval but the child still does not consume the food.*	"Can I have something else [instead of broccoli]?"	Request to eat different food than what was served
Physical Refusal – *Aggressive, direct physical indications of dislike or disapproval*	Child makes a negative face/spits out food	Cringe or make a negative face after seeing or eating certain foods
Physical Avoidance – *Passive, coy, sneaky, or creative physical acts in order to not consume the food. No direct indication of dislike or disapproval but the child still does not consume the food.*	Child licks ranch off broccoli, avoiding the broccoli Child takes apart the turkey and cheese sandwich, eating only the cheese	Eat foods with something in them that cannot be seen (ex: filled foods like ravioli)

Videos coded using codebook; every time behavior observed in video, marked on video using coding software Dedoose. Parents and childcare providers filled out a MAS per child enrolled. Response types were "Never, Rarely, Sometimes, Often, Always."

Table 5.2. Participant Demographics (% total).

Demographics	CBCC n (% total)			HBCC n (% total)		
	Parent (n = 25)	Provider (n = 9)	Child (n = 26)	Parent (n = 23)	Provider (n = 12)	Child (n = 24)
Sex						
Female	16 (64)	9 (100)	12 (46)	18 (78)	12 (100)	13 (54)
Male	9 (36)	--	14 (54)	5 (22)	--	11 (46)
Marital Status						
Married	21 (84)	3 (33)		14 (61)	8 (66)	
Single	4 (16)	6 (66)		9 (39)	4 (33)	
I prefer not to say	--	--				
Age						
3			9 (35)			9 (38)
4			11 (42)			8 (33)
5			6 (23)			7 (29)
18-25	2 (8)	--		4 (17)	1 (8)	
26-35	13 (52)	2 (22)		9 (39)	2 (17)	
36-45	8 (32)	1 (11)		10 (43)	1 (8)	
46-55	2 (8)	3 (33)		--	6 (50)	
56-65	--	3 (33)		--	2 (17)	
Ethnicity						
Caucasian	9 (36)	4 (44)		20 (87)	7 (58)	
Asian	12 (48)	--		--	--	
Black or African American	3 (12)	--		2 (9)	3 (25)	
Hispanic or Latino	1 (4)	3 (33)		--	--	
Other	--	2 (22)		1 (4)	2 (17)	
Education Level						
High school graduate	--	1 (11)		2 (9)	2 (17)	
Some college	5 (20)	1 (11)		5 (22)	5 (42)	
Bachelor's degree	2 (8)	7 (77)		9 (39)	2 (17)	

Table 5.2, continued

Post graduate degree	17 (68)	--	7 (30)	2 (17)
I prefer not to say	1 (4)	--		1 (8)
Income Level				
Under $25,000	5 (20)	3 (33)	4 (17)	2 (17)
$25,000 -$34,999	5 (20)	3 (33)	3 (13)	1 (8)
$35,000 –$49,999	1 (4)	--	2 (9)	2 (17)
$50,000 -$74,999	3 (12)	--	4 (17)	1 (8)
$75,000 -$99,999	--	1 (11)	8 (35)	2 (17)
$100,000 and over	11 (44)	--	2 (9)	1 (8)
I prefer not to say	--	2 (22)	--	3 (25)

Abbreviations: CBCC, Center-based childcare; HBCC, Home-based childcare

Table 5.3. Frequency of PE behaviors, Odd's Ratio, Confidence Interval, and P-value by location and meal type for (n=26) CBCC children.

	Physical Refusal		**Verbal Refusal**		**Physical Avoidance**		**Verbal Avoidance**	
	Popular	Non-Popular	Popular	Non-Popular	Popular	Non-Popular	Popular	Non-Popular
Home	24	45	50	74	11	102	5	11
CBCC	2	4	10	6	0	55	0	1
OR	2.21	3.06	2.89	4.53	1.65	1.79	1.19	1.63
95% CI	1.40 - 3.49	1.89 - 4.95	1.97 - 4.25	2.81 - 7.28	1.05 - 2.60	1.18 - 2.73	1.05 - 1.35	1.00 - 2.66
P-Value	0.0006	<0.0001	<0.0001	<0.0001	0.03	0.007	0.007	0.05

Frequency of PE behaviors by meal type and location presented as aggregate of observations for all CBCC children. Abbreviations: CBCC, center-based childcare; PE, picky eating, OR, odd's ratio, CI, confidence interval.

Table 5.4. Frequency of PE behaviors, Odd's Ratio, Confidence Interval, and P-value of PE behaviors by location and meal type for (n=24) HBCC children.

	Physical Refusal		**Verbal Refusal**		**Physical Avoidance**		**Verbal Avoidance**	
	Popular	Non-Popular	Popular	Non-Popular	Popular	Non-Popular	Popular	Non-Popular
Home	22	30	51	54	3	20	11	14
HBCC	6	19	21	59	17	168	4	6
OR	1.175	0.720	1.560	0.777	0.519	0.160	1.20	1.177
95% CI	0.62 - 2.23	0.32 - 1.60	0.88 - 2.78	0.35 - 1.74	0.28 - 0.98	0.08 - 0.32	0.80 - 1.78	0.82 - 1.70
P-Value	0.622	0.421	0.128	0.57	0.04	<0.0001	0.373	0.384

Frequency of PE behaviors by meal type and location presented as aggregate of observations for all HBCC children. Abbreviations: HBCC, home-based childcare; PE, picky eating, OR, odd's ratio, CI, confidence interval.

Table 5.5. Significant correlation coefficients (r) indicating the relationship between observed PE behavior during mealtime and reported PE behavior on MAS by caregiver type (Boquin et al., 2014a; Boquin et al., 2014b).

	Significantly Correlated PE Behaviors		
Caregiver Type	**Verbal Refusal**	**Verbal Avoidance**	**Physical Refusal**
CBCC Parents			0.53**
CBCC Providers		0.49**	
HBCC Providers	0.55**		0.76***

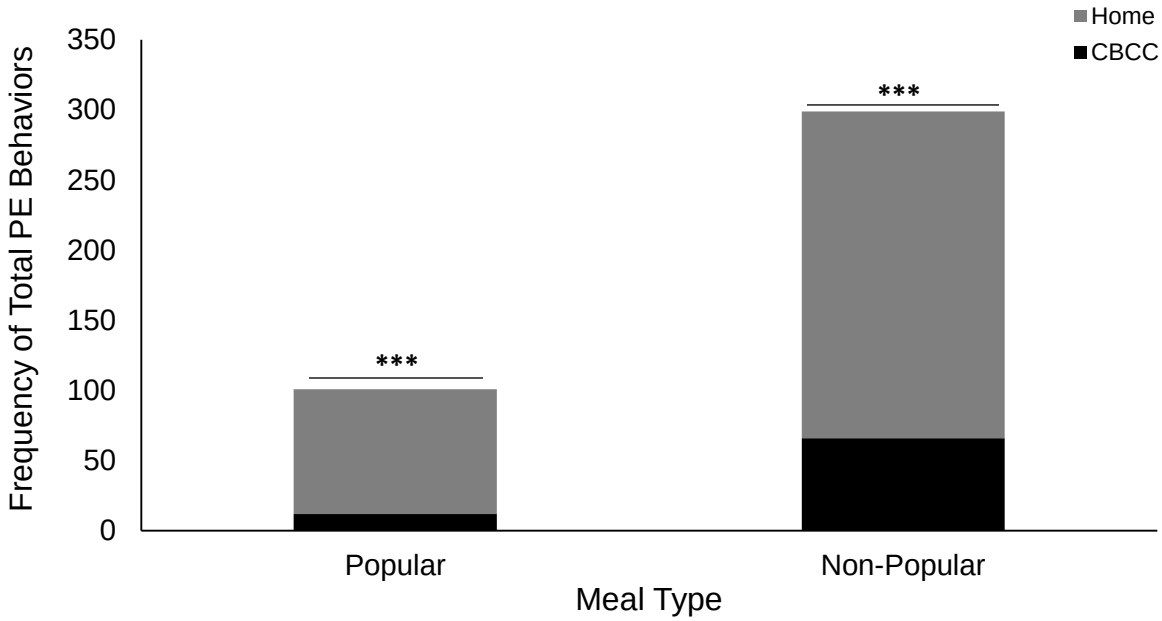
Correlation values from Spearman's Correlation Test, statistical significant a $p \leq 0.05$*, $p \leq 0.01$**, $p \leq 0.001$***.
No significant correlations were found between observed and reported PE behaviors for HBCC parents.
Abbreviations: HBCC, Home-based childcare, CBCC, center-based childcare; MAS, Mealtime Assessment Survey.

Figure 5.1. The non-popular meal (panel a): whole wheat sandwich with turkey and cheese, fresh broccoli, ranch dressing, and grapes. The popular meal (panel b): grilled chicken strips, tortilla chips with salsa, and a banana.

(a)

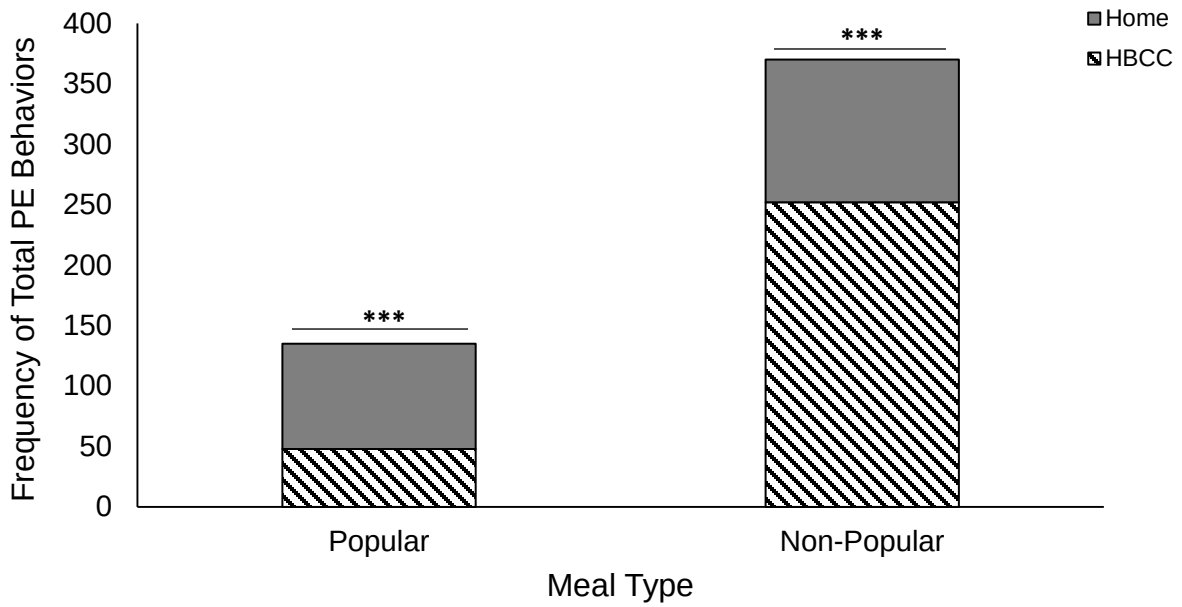
(b)

Figure 5.2. Frequency of total observed PE behaviors between CBCC children's (n = 26) home and childcare location.



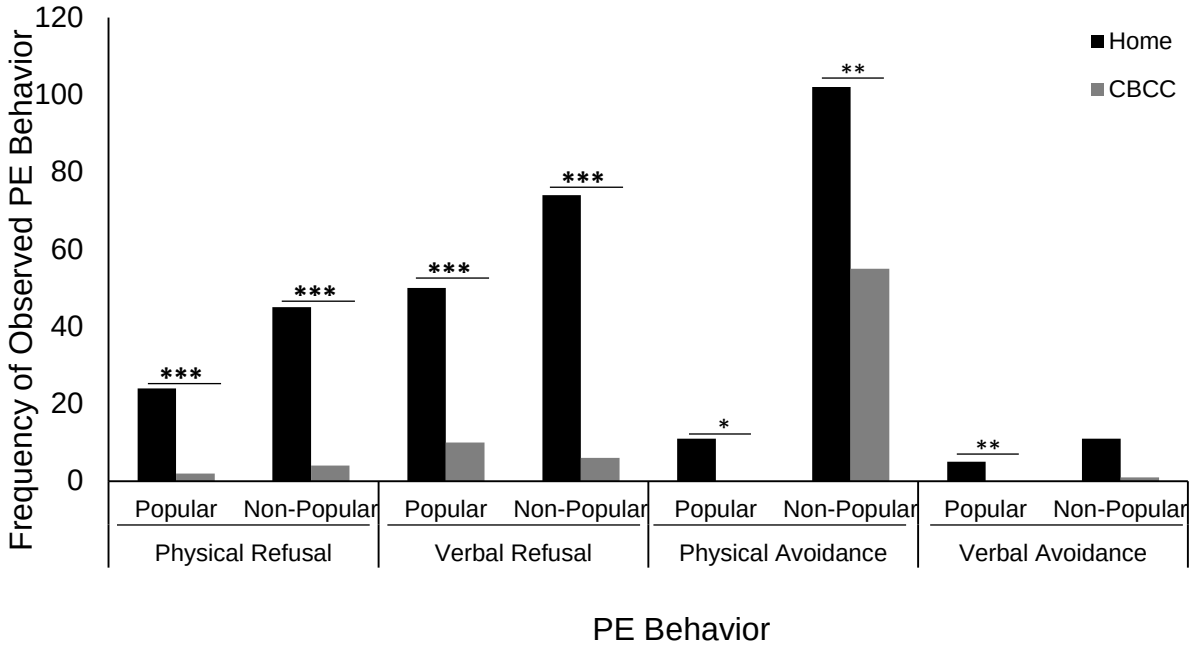
Data are presented as an aggregate of all observed PE behaviors for all children between the home and childcare location. Statistical differences between groups are indicated as ***$p \leq 0.001$. Abbreviations: CBCC, center-based childcare; PE, picky eating.

Figure 5.3. Frequency of total observed PE behaviors between HBCC children's (n = 24) home and childcare location.



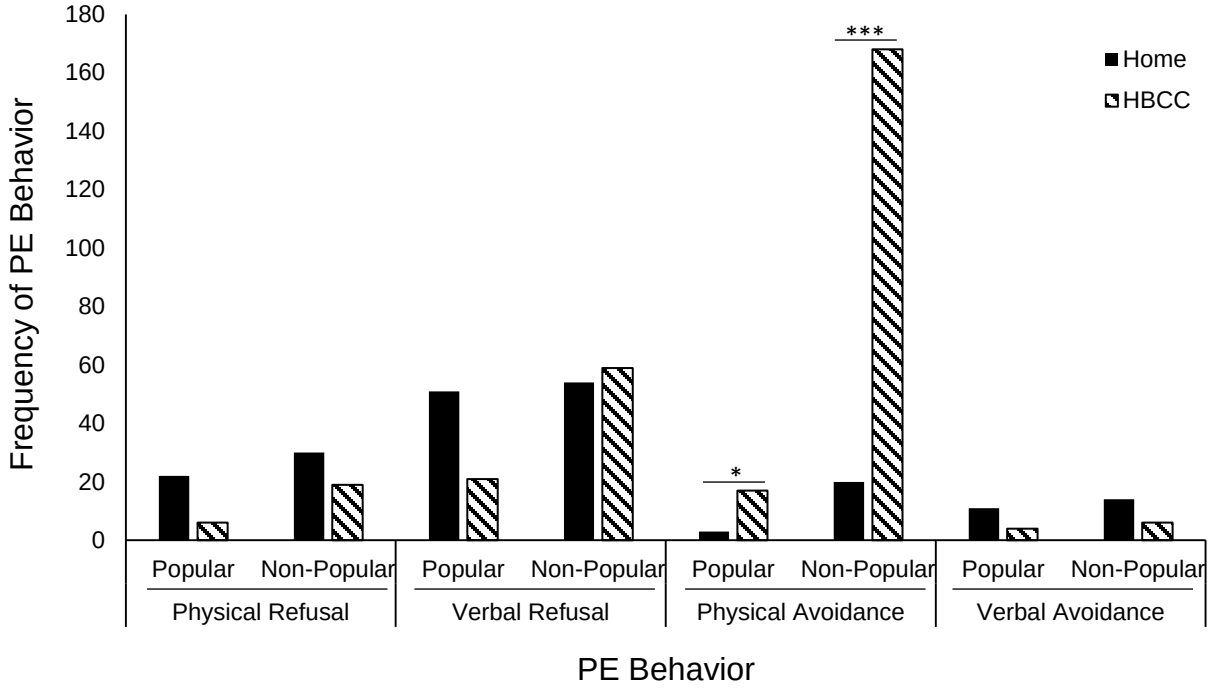
Data are presented as an aggregate of all observed PE behaviors for all children between the home and childcare location. Statistical differences between groups are indicated as **$p \leq 0.001$. Abbreviations: HBCC, home-based childcare; PE, picky eating.

Figure 5.4. Proportion of observed PE behavior between home and CBCC when CBCC children (n = 26) consumed the popular and non-popular meals.



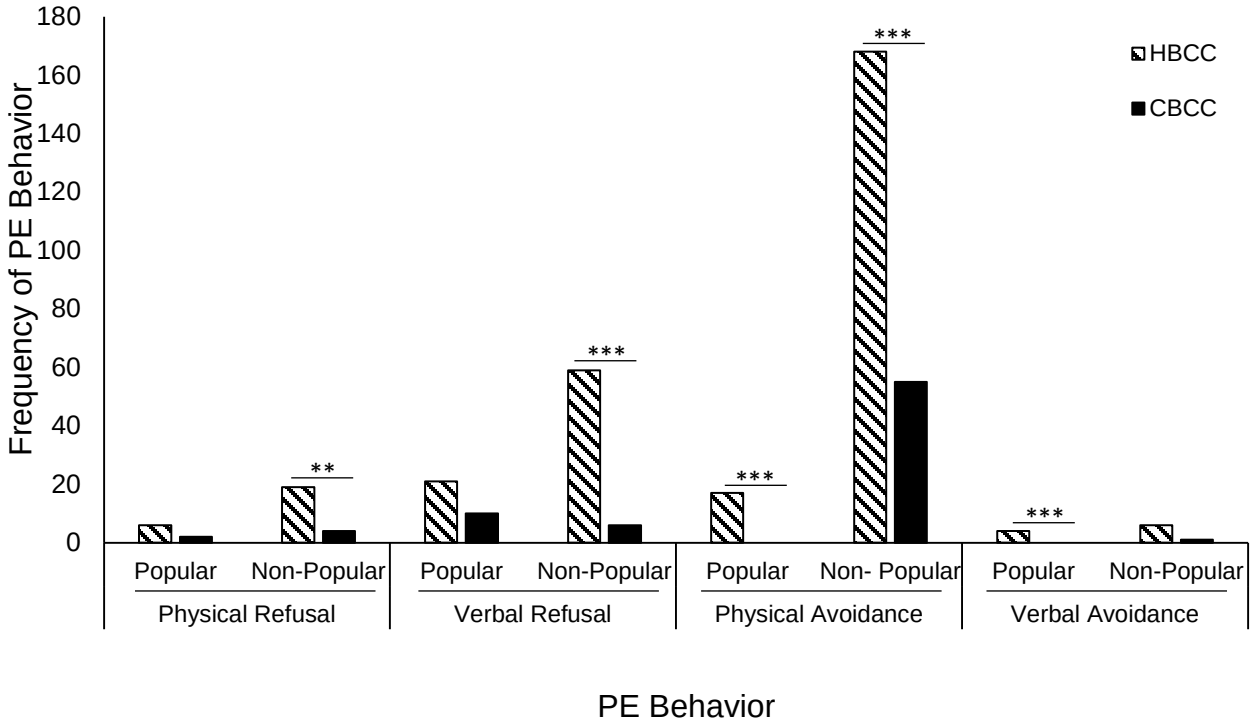
Data are presented as an aggregate of observed PE behaviors for all children between the home and CBCC location. Statistical differences between groups are indicated as ***$p \leq 0.001$. Abbreviations: CBCC, Center-based childcare; PE, picky eating.

Figure 5.5. Proportion of observed PE behavior between home and HBCC when HBCC children (n = 24) consumed popular and non-popular meals.



Data are presented as an aggregate of observed PE behaviors for all children between the home and HBCC childcare location. Statistical differences between groups are indicated as ***$p \leq 0.001$. Abbreviations: HBCC, Home-based childcare; PE, picky eating.

Figure 5.6. Proportion of observed PE behavior when children consumed popular and non-popular meals between children who attend HBCC (n = 24) compared to children who attend CBCC (n = 26).



Data are presented as an aggregate of observed PE behaviors for all children between HBCC and CBCC. Statistical differences between groups are indicated as **$p \leq 0.01$, ***$p \leq 0.001$. Abbreviations: HBCC, Home-based childcare; CBCC, Center-based childcare; PE, picky eating.

CHAPTER 6
Comparison of Reported and Observed Caregiver Mealtime Strategies of Parents and Home- and Center-based Childcare Providers in Response to Child Picky Eating Behavior

6.1 Abstract

Children's eating habits and food preferences tend to persist into adulthood and are largely influenced by their caregivers. Picky eating (PE) behavior is a barrier to the development of healthy eating habits, is a cause of concern for parents, and has been linked to several negative outcomes. Although children were once primarily cared for by their parents, today millions of children attend non-parental childcare settings, such as home (HBCC)-and center-based childcare (CBCC). Currently, there is a gap in the literature regarding how parents and childcare providers respond when the child is being picky. To address this question, children aged 3-5 years old in HBCC (n = 24) and CBCC (n = 26), their parents, and their childcare providers were recruited. Children and their childcare providers were observed twice consuming the same food at lunch at their respective childcare and the same child was observed twice consuming the same food at lunch with their parents. Caregivers, both parents and childcare providers, completed the Parent or Teacher Mealtime Strategy survey. Results from video observations show that parents were observed to respond significantly more to child PE behavior than were childcare providers, while childcare providers, regardless of location, were observed to ignore/not respond significantly more to child PE behavior. In addition, significant differences were found between the strategies that all caregivers reported to use compared to those that they were observed to utilize in response to child PE behavior. This work highlights the differences in reported and observed mealtime strategies between caregivers, as well as the need for intervention programs that take into consideration the multiple feeding environments where children eat in order to raise healthy, independent eaters.

Key Words: picky eating, mealtime strategies, center-based childcare, home-based childcare

6.2 Introduction

Caregivers are chiefly influential in the development of children's eating habits and food preferences (Hughes et al., 2007; Nahikian-Nelms, 1997; Patrick et al., 2005; Savage, Fisher, & Birch, 2007). By serving as the gatekeepers of the food the child has access to, caregivers determine what foods the child is exposed to (Birch, Savage, & Ventura, 2007; Nicklas et al., 2001). Caregivers also employ strategies at mealtime that may increase or decrease a child's preferences for certain foods (Patrick et al., 2005). Effective mealtime strategies are those that increase a child's preference for a variety of nutrient-dense foods, while ineffective strategies decrease a child's liking for such foods. Because the eating habits that are formed during childhood tend to persist later in life, establishing healthy eating habits early on is imperative for optimum health (Schwartz et al., 2011).

However, establishing healthy eating habits in young children can be a challenge for caregivers, as barriers to feeding can arise, including picky eating (PE) behavior (Cathey & Gaylord, 2004). Picky eating is typically defined as rejecting unfamiliar and familiar foods and having low dietary variety (Dovey et al., 2008). Studies have shown that up to 50% of parents perceive their child as being a PE (Carruth et al., 2004). Picky eating has been linked to several negative outcomes such as depression (Zucker et al., 2015), lack of dietary variety (Carruth et al., 1998a), child underweight (Dubois et al., 2007), increased risk for developing unhealthy eating habits later in life (Marchi & Cohen, 1990), and parental concern over the child's food consumption (Cullen et al., 2000).

Though parents are typically considered the primary caregivers, today millions of children under the age of 5 are cared for in non-parental childcare settings (Laughlin, 2013). Commonly, children are cared for in childcare settings, typically center or home-based childcare. Home-based childcare (HBCC) facilities are centers where children are cared for in the caregiver's house, the number of children cared for is typically low, and child age range can vary dramatically (Martyniuk et al., 2016). Center-based childcare (CBCC) facilities on the other hand are more similar to a school-like setting; children are separated by age into classrooms and there are several children and caregivers within the facility (Natale, Page, & Sanders, 2014). Children spend on average 35 hours per week in these settings and can consume up to ½ of their daily nutrient needs at childcare (Dev et al., 2014; Laughlin, 2013).

While the importance of caregivers in the formation of child food preferences, the negative outcomes associated with PE behavior and the amount of time children spend in childcare is known, there is a gap in the literature that investigates differences in mealtime strategy utilization, specifically in response to child PE behavior (Bergmeier, Skouteris, & Hetherington, 2015), between parents and childcare providers who care for the same child. Therefore, the objectives of this research were to 1) identify the strategies that parents and childcare providers report utilizing at mealtime; 2) observe via videotape the actual strategies that parents and childcare providers utilized in response to PE behaviors; and, 3) correlate reported to observed parent and childcare provider mealtime strategies. It was hypothesized that parents and childcare providers in the two settings would report and be observed to utilize different strategies at mealtime. We further hypothesized that the reported and observed strategies would be positively correlated.

6.3 Methods

Participants

All materials and methods were approved by the University of Illinois Institute Review Board. Twelve HBCC and three classrooms from the CBCC on the University of Illinois campus in the Champaign-Urbana area were recruited to participate in the study. Parents utilizing these childcare centers were then contacted to participate in the study.

A total of 50 children and their parents were recruited, 24 from HBCC and 26 from CBCC. Participation requirements included having at least one child aged 3-5 years with no food allergies. The 3-5 year old age range for the study was determined based on previous literature that states this age range to be when picky eating behaviors peak (Cardona Cano et al., 2015; Carruth et al., 1998b). If parents had two children meeting the inclusion criteria, they could include both children in the study if desired. Only one single-parent household from HBCC and CBCC included two children, resulting in 26 children and 25 parents from CBCC and 24 children and 23 parents from HBCC. In addition, two HBCC providers also enrolled one of their own children in the study. All statistical analyses were completed with these participants either included or excluded to assess confounding effects of being both the parent and the provider, and the interpretation of the results did not change in any of the statistical analyses, so these participants were included in the final presentation of the results and interpretations.

Observations

Children and their childcare providers were observed consuming lunch twice at their respective childcare, once consuming the “popular” meal and once consuming the “non-popular” meal. The same children were then also observed consuming the same “popular” and “non-popular” lunches at home with their parents. This resulted in four meal observations per child

and 200 meal observations in total. Average time between childcare and home observations was 30 days to prevent participant fatigue of the meals served during observations. Regardless of location and participation in the study, everyone (i.e non-participating children in CBCC or HBCC or other family members) present at the observed meals received the same food.

The "non-popular" meal consisted of a whole wheat sandwich with turkey and cheese, fresh broccoli, ranch dressing, and grapes, and the "popular" meal consisted of grilled chicken strips, tortilla chips with salsa, and a banana. Non-popular and popular menus were created based on previous literature reporting typical toddler food preference and consumption patterns (Boquin et al., 2014b; Fox et al., 2004; MacInnes, 2012).

Mealtimes were recorded using video cameras discreetly placed in the meal environment. In order to minimize alterations in behavior in participants due to the presence of researchers, study staff would set up the cameras, leave the house/school, and return once the meal was over. After the meal was complete, caregivers were asked to rate how typical the meal was. Atypical meals (<10%) were rescheduled until a typical meal was captured on camera.

Coding

First, frequency of child PE behaviors were coded from the videos using a codebook that was created from methods previously used in the literature (Klesges et al., 1983; MacInnes, 2012; Orrell-Valente et al., 2007). Four behaviors were included in the codebook to quantify the essence of PE behaviors: physical food refusal and avoidances and verbal food refusals and avoidances (Sanders, Patel, Le Grice, & Shepherd, 1993).

Once the frequency of PE behaviors were coded for, caregiver strategies used in response to every child's PE behavior were added to the codebook. Caregiver strategies were added based on prevalence of their use during observations and previous literature describing the most

effective mealtime strategies (Birch et al., 1982; Cullen et al., 2001; Fisher et al., 2002; Galloway et al., 2005; Patrick & Nicklas, 2005). Four mealtime strategies were added: encouragement (i.e., "you should try the broccoli"), modeling (i.e., "I like the broccoli," or caregiver actively takes a bite of rejected food to show the child they are eating it), question (i.e., "why don't you like the broccoli?"), and other. The caregiver's "other" response was further recorded qualitatively. In addition, ignoring/no response was added to the codebook and calculated by subtracting the total number of observed child PE behaviors from the number of PE behaviors that elicited a response from the caregiver.

Research assistants were trained until they reached acceptable inter-rater reliability of Cohen's Kappa of > 0.90. To avoid coder drift, 20% of videos were also coded by the master coder (Edelson, Mokdad, & Martin, 2016). Any questions that arose between coders about coded excerpts were resolved by the lead coder. Once research assistants were trained, videos were coded using the software Dedoose software (Version 7, SocioCultural Research Consultants, LLC, Manhattan Beach, CA).

Surveys

Parents and childcare providers completed the Parent or Teacher Mealtime Assessment Survey (PMS/TMS) respectively, which assessed how often they utilized each mealtime strategy (**Table 6.1**). These surveys were developed through a series of focus groups and conjoint analyses examining actions displayed by children and caregivers during feedings and have been used in previous studies (Boquin et al., 2014a; Boquin et al., 2014b). Response options on the surveys were on a 1-5 scale, representing Always, Often, Sometimes, Rarely, and Never. In order to be able to compare observed to reported strategies, only "Always/Often" responses for each strategy were included in the analysis. This method of dichotomization, which is more

conservative than typical methods (Jacobi et al., 2003), was used in order to increase the likelihood that those with perceived high utilization of the mealtime strategies would also be observed to utilize the strategies during the videotaped mealtime.

Both the PMS and TMS contained the same questions unless not applicable based on mealtime location. For example, one of the questions on the PMS asks how often parents make a different food for their child before the meal if they do not like what is being served, which is typically not an option childcare providers have. Each participant was given specific instructions to think about the child whom the survey was about and answer the questions accordingly. Parents and childcare providers completed one survey per child. In order to compare observed behavior to reported behavior, questions on the survey had to match coded behaviors in the codebook. Three questions from the PMS/TMS: Encouragement, Modeling, and Ignoring, were used in comparison to coded responses.

Data Analysis

After videos had been coded for PE behaviors, videos were re-watched and coded for caregiver mealtime strategies utilized in response to every coded child PE behavior. The frequency of utilized caregiver mealtime strategies in response to child PE behavior were aggregated for each location and type of strategy.

To identify differences in reported and observed strategy utilization, a two-tailed Chi-square test was used. In order to correlate observed versus reported caregiver responses, Spearman's Correlation analysis was conducted. Significance for all tests were set to $p < 0.05$. All statistical analyses were performed using Microsoft Excel (Version 15.0.4727.1000 Redmond, WA, USA) and Statistical Analysis Software (SAS) version 9.4 (SAS Institute, Cary, NC, USA).

6.4 Results

Demographics: Fifty children, their parents, and their childcare providers participated in the study. The parents in the study were predominantly female, married, and Caucasian (**Table 6.2**). Parents who utilized CBCC had higher education and income level than HBCC parents. Childcare providers were all female, regardless of childcare location and most were above 45 years of age. Center-based childcare providers had more educated than HBCC providers, and similar to parents, most providers were Caucasian. Children were split evenly between males and females and across ages for both locations. More detailed demographic information can be found in Table 6.2.

Reported Mealtime Strategies: A large percentage of both HBCC parents and providers reported utilizing encouragement "always" or "often" at mealtime (**Figure 6.1**). Almost all HBCC providers reported using modeling always/often, compared to 79% of HBCC parents. Though not statistically significant, only 23% of HBCC parents reported using ignoring as a strategy compared to 45% of HBCC providers. Similar trends are seen within the CBCC location (**Figure 6.2**), in that a high percentage of both parents and childcare providers reported using encouragement at mealtime and more CBCC providers reported using ignoring "always/often" than parents. However, CBCC providers reported utilizing modeling significantly more than CBCC parents ($p < 0.001$).

Observed Mealtime Strategies: Of the total PE behaviors observed in homes of families who utilize HBCC, parents responded to 46% of PE behaviors with encouragement, 9% of PE behaviors with modeling, 35% of PE behaviors with a question, and 35% of PE behaviors with "other" (**Figure 6.3**). Interestingly, HBCC parents were never observed to ignore or not respond to their child's PE behavior. In fact, they over-compensated with multiple responses per PE

behavior, meaning that for every child PE behavior that was observed, instead of utilizing one mealtime strategies or no mealtime strategies, HBCC parents utilized 2 or 3 mealtime strategies. In contrast, HBCC providers used almost opposite strategies as HBCC parents. Significantly more HBCC providers were observed to ignore/not respond to PE behavior ($p < 0.001$) than HBCC parents. In addition, HBCC providers utilized encouragement, questions, modeling, and "other" strategies significantly less often in response to children's PE behavior than HBCC parents ($p < 0.001$) (Figure 6.3).

Center-based childcare parents were observed to use variety of strategies, but were mostly to ignore/not respond to child PE behavior (**Figure 6.4**). The most common strategies used by CBCC parents were encouragements (23%), questions (21%), other (16%), and only 4% was modeling. Similar to HBCC providers, CBCC providers largely ignored or did not respond to children's PE behavior (Figure 6.4). Seven percent of CBCC providers responses were other, 3% were modeling, 1% were questions, and no encouragements were observed in the CBCC. Center-based childcare parents were found to utilize encouragement and questions in response to child PE behavior significantly more often than CBCC providers ($p < 0.001$) and CBCC providers were found to utilize ignoring/no response significantly more often than CBCC parents ($p < 0.001$).

Correlation between Observed and Reported Mealtime Strategies: Due to the differences in reported and observed behaviors it is unsurprising that no correlations were found between any strategies that parents and childcare providers reported using on the PMS/TMS and what was observed at mealtime. Furthermore, Chi-square results indicated a significant difference between caregiver report and observed utilized strategies for all strategies utilized by HBCC parents ($p < 0.001$) (**Figure 6.5**), HBCC providers ($p < 0.001$) (**Figure 6.6**), and CBCC providers

($p < 0.001$) (**Figure 6.7**). Encouragement and modeling were found to be significantly different between reported and observed behavior for CBCC parents ($p < 0.001$), however, ignoring/no response was not (**Figure 6.8**).

6.5 Discussion

Care providers play a key role in helping young children develop healthy eating habits. In the U.S., millions of preschoolers spend up to 35 hours a week in non-parental care (Laughlin, 2013), where they typically consume several meals and snacks. As such, childcare providers are important counterparts to parents in influencing the food preferences and eating habits of young children. However, no study to date has evaluated what types of messages that a child receives from their parent and childcare provider within the context of a similar meal. Furthermore, the effect of childcare setting (i.e., center- vs. home-based) has not been investigated.

In this study we found that between HBCC parents and providers, self-report of mealtime strategy usage of encouragement, modeling, and ignoring/no response were similar. This suggests congruency in how these caregivers perceive their mealtime strategy utilization. Given the unique nature of the HBCC environment, in that typically the caregiver is someone who the parent knows personally (Tovar et al., 2015), HBCC caregivers and parents may communicate about the child's eating behavior and coordinate their care, leading to more congruency in self-report between these caregivers.

However, when mealtime strategies were observed in response to PE behavior for HBCC parents and HBCC providers, parents were observed to utilize all strategies significantly more often than providers, except for ignoring/no response; HBCC providers were observed to ignore/not respond to PE behaviors by the child significantly more often than parents. Parents

may respond to a child's PE behavior to a greater degree than the child's provider due to the parent's concern for how their child is eating (Carruth et al., 1998a; Galloway et al., 2005). It could also be that parents are more likely than HBCC providers to notice the child's PE behavior and, consequently, react to it. Future research should investigate why HBCC parent sensitivity to child PE behavior is much greater than HBCC providers.

Center-based childcare parents and providers had similar self-report of how often they used encouragement and ignoring/no response, however, more CBCC providers reported using modeling than CBCC parents. The difference in reported strategy utilization for modeling can most likely be explained by the CBCC policies around mealtimes. Typically, CBCC locations have specific instructions for providers during mealtime, including what strategies providers should and should not use (American Academy of Pediatrics et al., 2002; Neelon & Briley, 2011). Since modeling is a mealtime strategy shown to be effective in increasing children's food preferences for a variety of foods (Moore, Tapper, & Murphy, 2007), modeling, along with encouraging comments, is often recommended to be used by providers at mealtime (Neelon & Briley, 2011).

When mealtime videos were reviewed for mealtime strategies used in response to PE behavior, CBCC parents were observed to employ encouragement and questions significantly more often than providers, while providers ignored/did not respond to a child's PE behavior significantly more often than parents. Similarly to HBCC parents, CBCC parents may have used a greater variety of mealtime strategies than providers due to concern over their child's PE behavior. In an effort to remedy their child's PE behavior, and therefore their concern over this behavior, parents may employ more strategies than providers. CBCC providers, on the other hand, not only typically have policies recommending certain strategies that are to be utilized or

not utilized, they also may have other concerns at mealtime, for example, curriculum development or implementation, that cause them not to respond to children's PE behavior (Faulkner et al., 2014).

For all caregivers, significant differences were found between reported versus observed mealtime strategies. This could be due, in part, to the fact that caregiver response on the PMS/TMS reflected often the strategies were used in general, not specifically in response to PE behaviors. Had the surveys asked what strategies caregivers typically use in response to the child's PE behaviors, the results may have been different. However, only caregivers that responded that they utilized strategies "always" or "often" on the surveys were included the analysis, so such large differences between reported and observed mealtime strategy utilization is still an important finding. As an overall trend, caregivers almost always reported utilizing strategies significantly more than what they were observed to be utilized, highlighting the importance of observational research to identify the true happenings of what is occurring.

6.6 Conclusion

Parents, regardless of whether their child attended HBCC or CBCC, were observed to utilize significantly more strategies than childcare providers in response to observed PE behaviors, with the exception of ignoring/no response. Differences in concern over the child's PE behavior or policies regarding mealtime at the childcare location could be reasons why parents and childcare providers were observed to respond differently to child PE behavior at mealtime. More research is needed to identify why parents responded significantly more to children's PE behavior, while childcare providers mostly ignored or did not respond to PE behavior. In addition, large differences between reported and observed mealtime behaviors were

found for all caregivers, which highlights the benefit of observational research. Future observational research should take into account the components of the mealtime environment, for example, whether electronics were present at the meal, if the caregiver sat with the children during the meal, how many children were at the table, etc., to identify whether that affected how caregivers responded to child PE behavior.

This study is not without limitations. First, due to the alignment between the observational codebook and the surveys, only 3 strategies from the PMS/TMS matched behaviors we coded for from the videos. Future research will investigate other interactions between the care providers and the children during mealtime. Second, because of the recruitment method and logistical complexity of this study, we were unable to randomize which meal, popular or non-popular, the children were exposed to first. In almost all cases, children were exposed to the food at childcare first. This may have impacted how the child behaved at mealtime, and therefore, impacted how the caregiver behaved. However, our main objectives for this study were to compare responses to PE behavior between different caregivers once they occurred, not assess differences in PE behavior in children. In addition, all CBCC participants were recruited from one CBCC. Perhaps we would have seen different results if different types of CBCC had been recruited. Future studies will work to randomize meal order and include different types of center-based childcare centers to eliminate these potential limitations.

Taken together, this work highlights the need for more observational research in both home and childcare locations and the development of intervention programs that take into consideration the multiple feeding environments that children are exposed to in order to raise healthy, independent eaters.

6.7 Tables and Figures

Table 6.1. Parent and Teacher Mealtime Strategies Survey Questions (Boquin et al., 2014a; Boquin et al., 2014b)

Question*	Parent Survey	Teacher Survey
Offer your child a favorite food, snack or sweet/dessert as a reward for eating.	X	
Offer your child a non-food reward for eating food served at a meal	X	
Withhold a favorite food, snack or sweet/dessert as a consequence for not eating.	X	
Involve your child in planning and preparing the meal.	X	
Make your child finish all of the meal before getting dessert.	X	
Make a different food for your child before the meal if they don't like what is being served.	X	
Make a different food for your child after the meal if they didn't eat the food that was served.	X	
Serve a combination of foods that are new and/or disliked with foods already preferred by your child/student	X	X
Arrange the food in an interesting way to make the meal fun	X	X
Teach your child/student about the food served at the meal	X	X
Require your child/student to try a bite of each food on their plate.	X	X
Show disapproval if your child/student does not eat.	X	X
Allow your child/student to choose the foods they want to eat from the food that is served.	X	X
Praise your child/student about their food intake or feeding skills.	X	X
Tell your child/student they cannot leave the table until a food is eaten.	X	X
Spoon-feed your child/student to get them to eat.	X	X
Ignore your child's/student's fussiness when they are being picky about the food served.	X	X
Encourage your child/student to try new foods.	X	X
Allow your child/student to eat what and how much they want at the majority of meals.	X	X
Make the meal into a game to encourage eating.	X	X
Model to your child that Mom and/or Dad/Teacher are eating the food so they should eat the food too.	X	X
Not need to use any strategies to get your child/student to eat at mealtime.	X	X
Tell your student they have to try a bite of everything before getting seconds		X
Withhold something as a consequence for not eating		X

*For the Parent Mealtime Strategy Survey the term "child" is used on the survey and the term "student" is used on the Teacher Mealtime Strategy Survey

Table 6.2. Participant Demographics (% total).

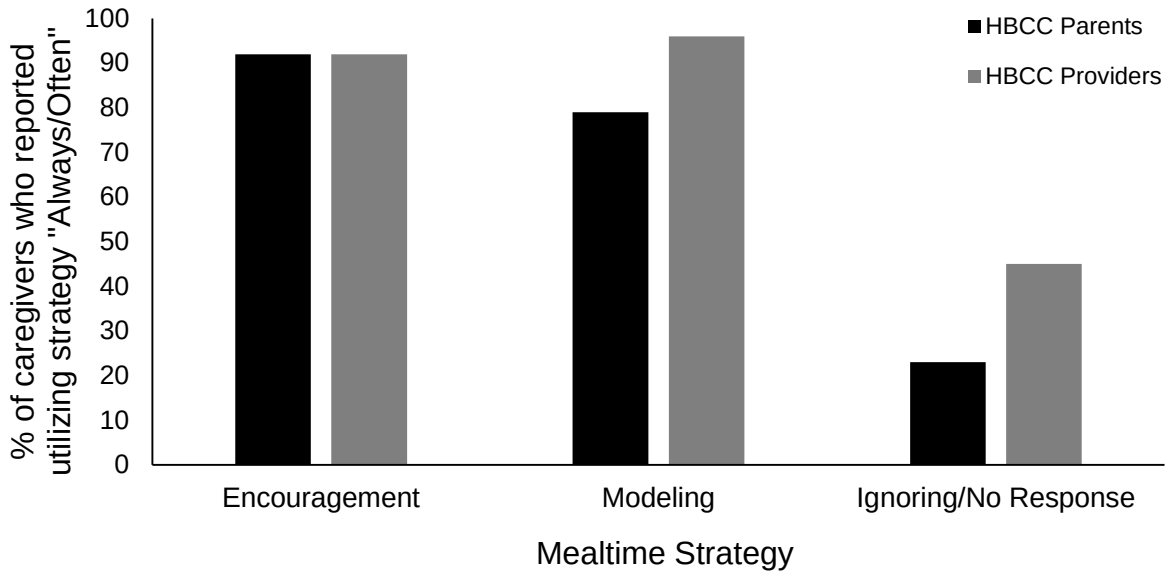
Demographics	CBCC n (% total)			HBCC n (% total)		
	Parent (n = 25)	Provider (n = 9)	Child (n = 26)	Parent (n = 23)	Provider (n = 12)	Child (n = 24)
Sex						
Female	16 (64)	9 (100)	12 (46)	18 (78)	12 (100)	13 (54)
Male	9 (36)	--	14 (54)	5 (22)	--	11 (46)
Marital Status						
Married	21 (84)	3 (33)		14 (61)	8 (66)	
Single	4 (16)	6 (66)		9 (39)	4 (33)	
I prefer not to say	--	--				
Age						
3			9 (35)			9 (38)
4			11 (42)			8 (33)
5			6 (23)			7 (29)
18-25	2 (8)	--		4 (17)	1 (8)	
26-35	13 (52)	2 (22)		9 (39)	2 (17)	
36-45	8 (32)	1 (11)		10 (43)	1 (8)	
46-55	2 (8)	3 (33)		--	6 (50)	
56-65	--	3 (33)		--	2 (17)	
Ethnicity						
Caucasian	9 (36)	4 (44)		20 (87)	7 (58)	
Asian	12 (48)	--		--	--	
Black or African American	3 (12)	--		2 (9)	3 (25)	
Hispanic or Latino	1 (4)	3 (33)		--	--	
Other	--	2 (22)		1 (4)	2 (17)	
Education Level						
High school graduate	--	1 (11)		2 (9)	2 (17)	
Some college	5 (20)	1 (11)		5 (22)	5 (42)	
Bachelor’s degree	2 (8)	7 (77)		9 (39)	2 (17)	

Table 6.2, continued

Post graduate degree	17 (68)	--	7 (30)	2 (17)
I prefer not to say	1 (4)	--		1 (8)
Income Level				
Under $25,000	5 (20)	3 (33)	4 (17)	2 (17)
$25,000 -$34,999	5 (20)	3 (33)	3 (13)	1 (8)
$35,000 –$49,999	1 (4)	--	2 (9)	2 (17)
$50,000 -$74,999	3 (12)	--	4 (17)	1 (8)
$75,000 -$99,999	--	1 (11)	8 (35)	2 (17)
$100,000 and over	11 (44)	--	2 (9)	1 (8)
I prefer not to say	--	2 (22)	--	3 (25)

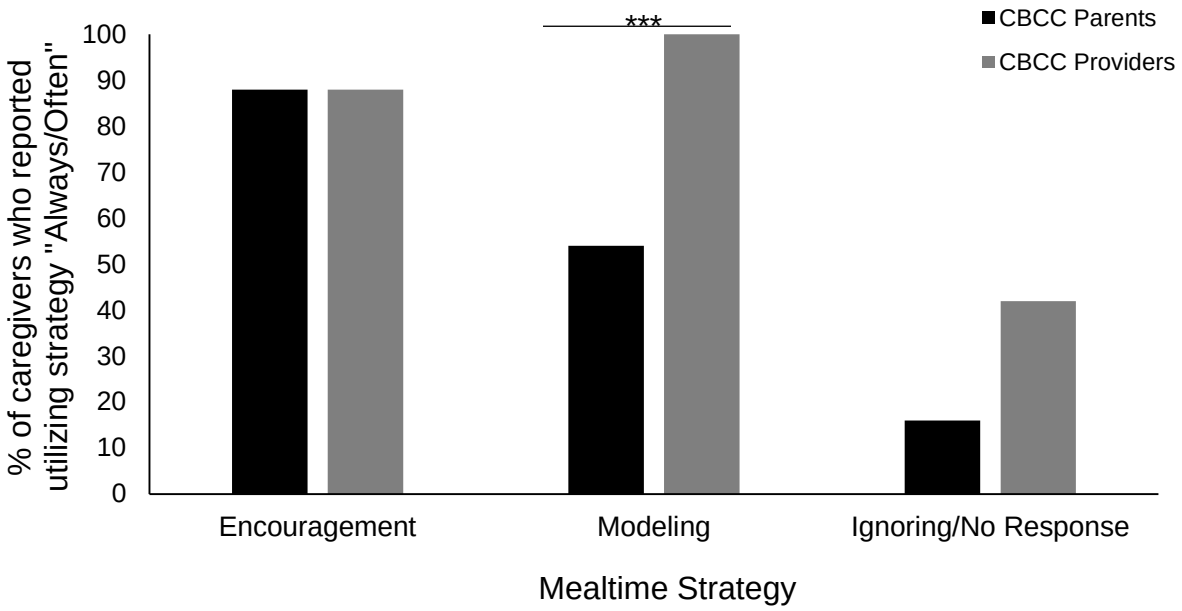
Abbreviations: CBCC, Center-based childcare; HBCC, Home-based childcare

Figure 6.1. Mealtime strategies HBCC caregivers reported utilizing "Always/Often" for (n = 24) children on the Parent or Teacher Mealtime Survey (PMS/TMS). (MacInnes, 2012).



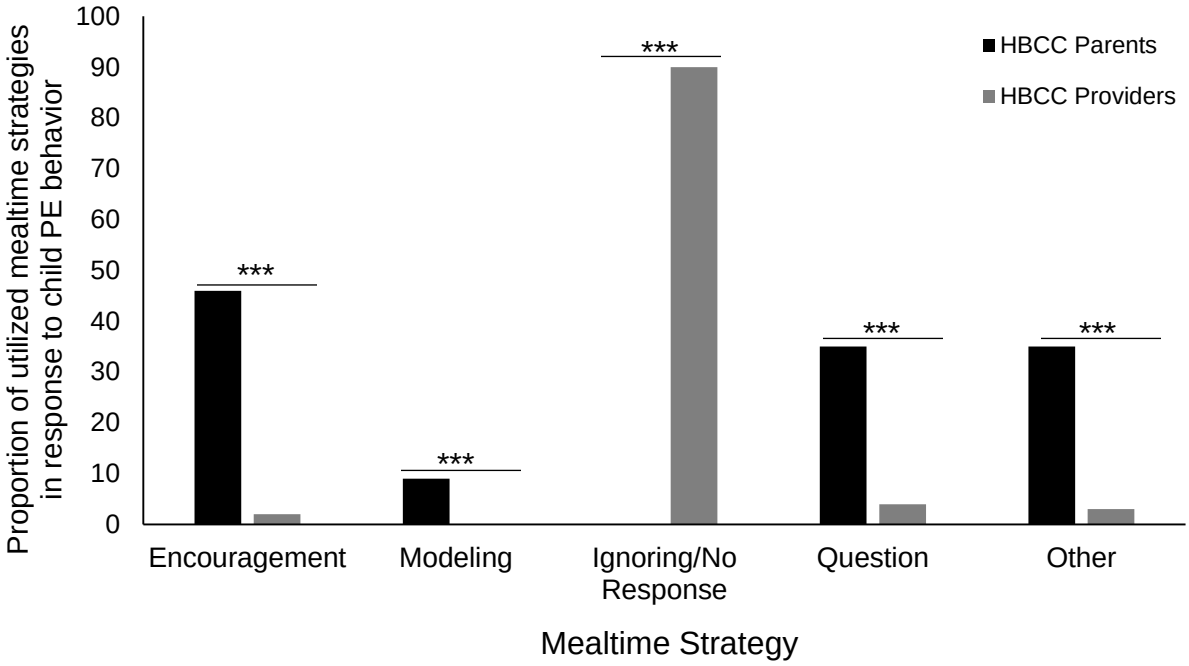
Using chi-square statistics, no significant differences were found between HBCC parents and providers in their report of how they utilize these mealtime strategies on the PMS/TMS, indicating congruency between these caregivers. Abbreviations: HBCC, home-based childcare.

Figure 6.2. Mealtime strategies between CBCC caregivers who report utilizing mealtime strategies "Always/Often" for (n = 26) children on the Parent or Teacher Mealtime Survey (PMS/TMS) survey.



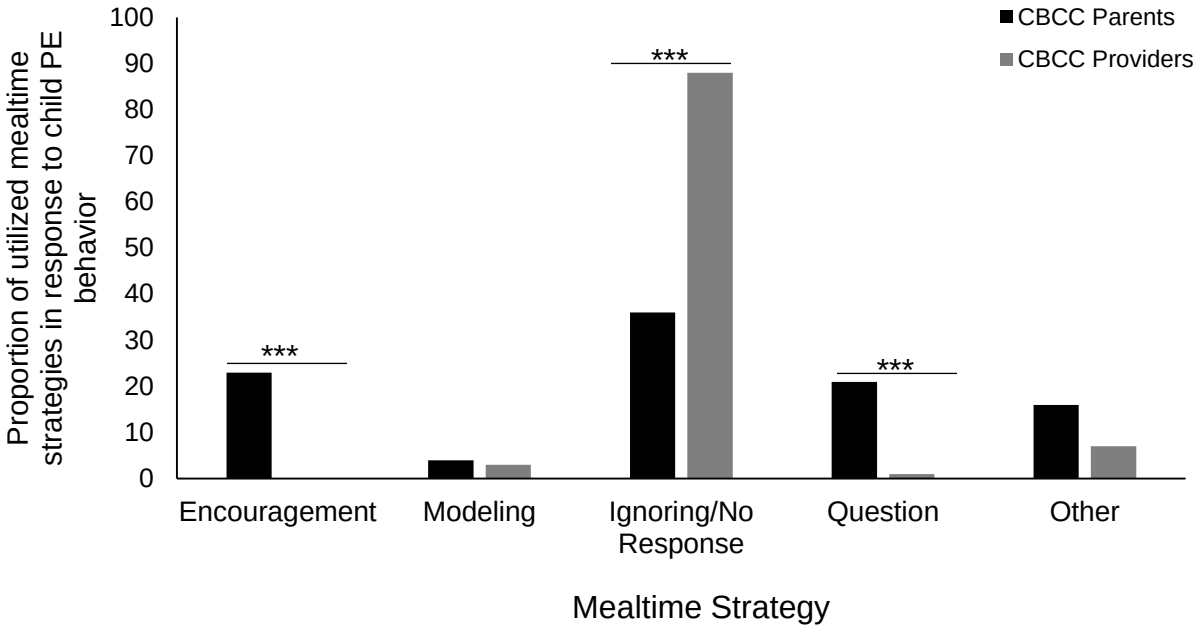
***$p < 0.001$. Using chi-square statistics, modeling was found to be utilized significantly more by CBCC providers than CBCC parents via report on the PMS/TMS. No significant difference was found for encouragement or ignoring/no response. Abbreviations: CBCC, center-based childcare.

Figure 6.3. Proportion of utilized mealtime strategies by HBCC caregivers in response to child PE behavior. Total n of PE behaviors expressed with HBCC parents = 208, total n of PE behaviors expressed with HBCC providers = 300.



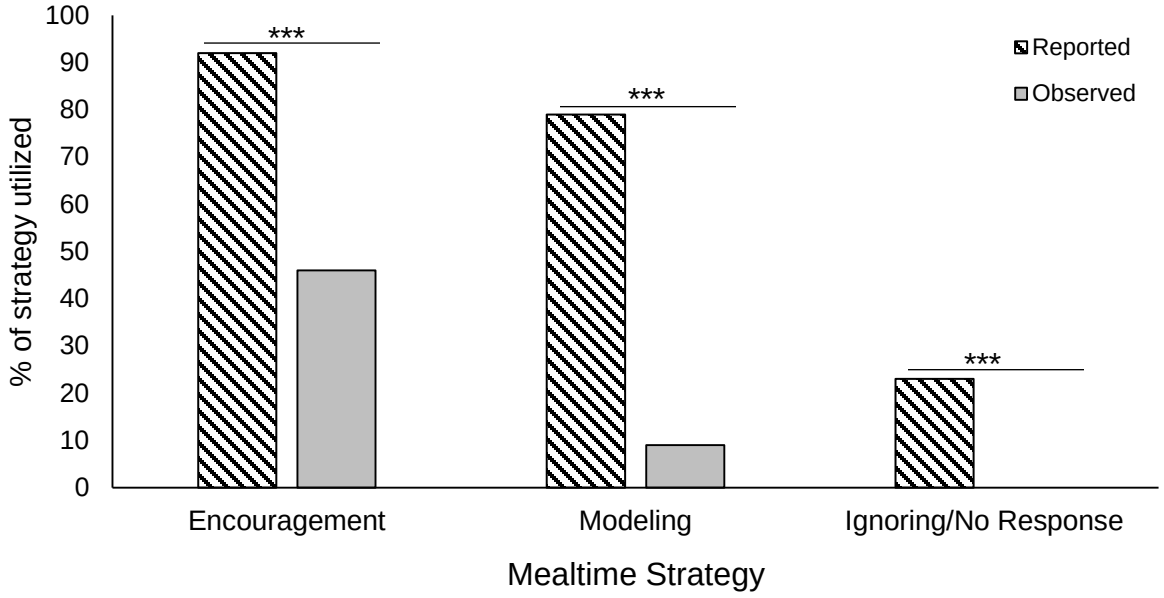
***$p < 0.001$. Using chi-square statistics, HBCC parents were observed to utilize all strategies significantly more than HBCC providers, except for ignoring/no response. Abbreviations: HBCC, home-based childcare; PE, picky eating.

Figure 6.4. Proportion of utilized mealtime strategies by CBCC caregivers in response to child PE behavior. Total n of PE behaviors expressed with CBCC parents = 322, total n of PE behaviors expressed with CBCC providers = 78.



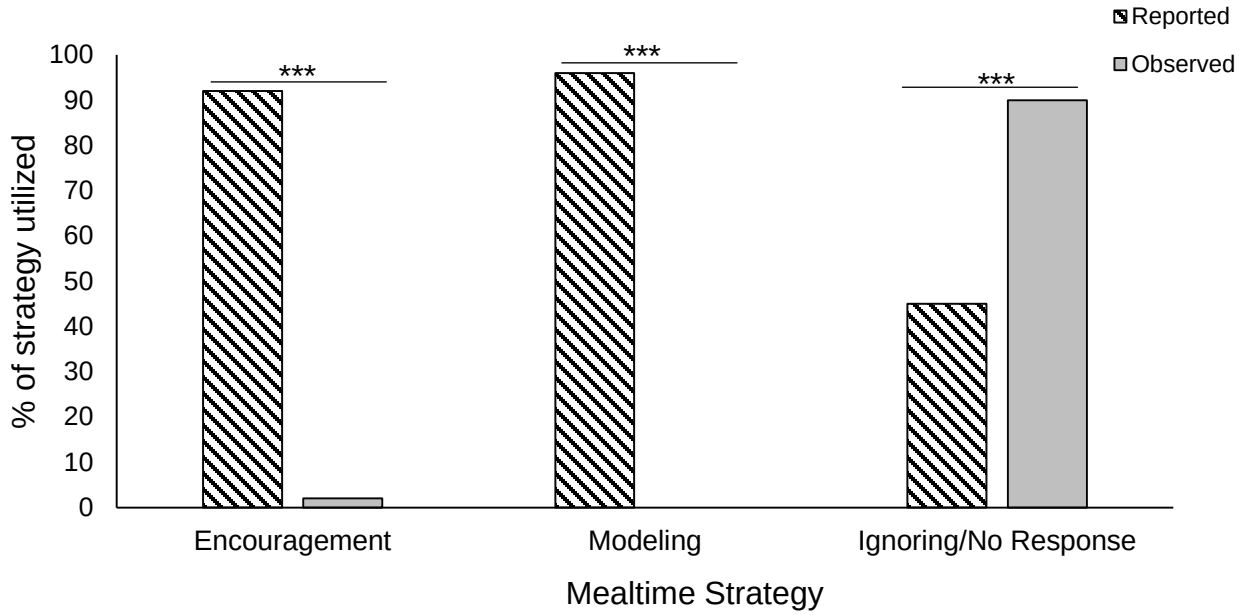
***p < 0.001. Using chi-square statistics, CBCC parents were observed to utilize encouragements and questions significantly more than CBCC providers. Center-based daycare providers were observed to utilize significantly more ignoring/no response than parents. Abbreviations: CBCC, center-based childcare; PE, picky eating.

Figure 6.5. Home-based childcare parent reported vs. observed mealtime strategy utilization for (n = 24) children. Total observed PE behaviors in HBCC home location = 208.



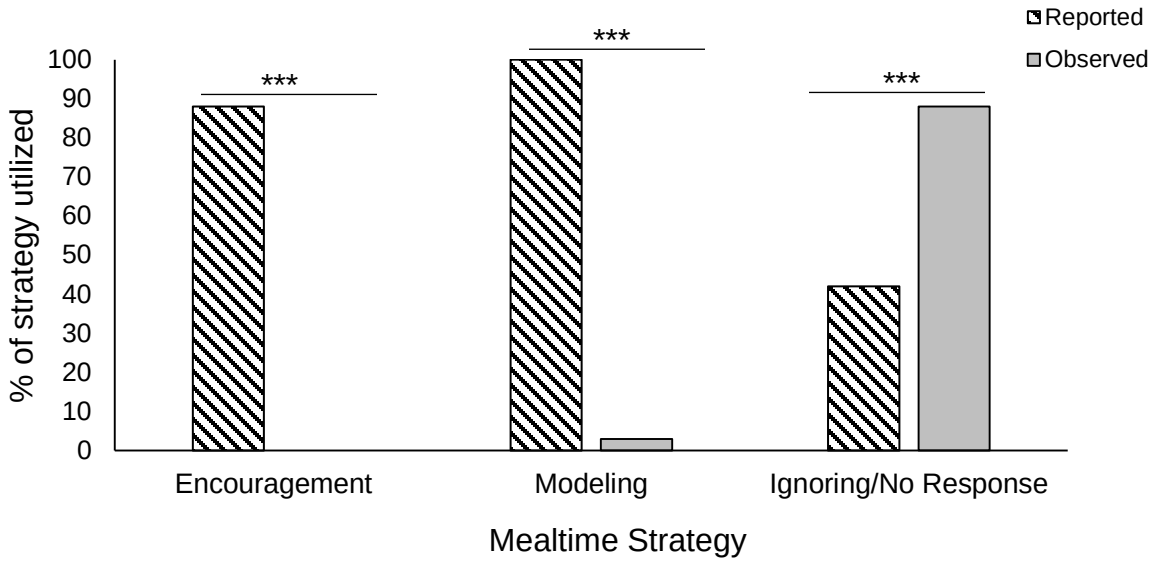
***p < 0.001. HBCC parents reported utilizing all strategies "always/often" significantly more than what was observed at mealtime. Abbreviations: HBCC, home-based childcare; PE, picky eating.

Figure 6.6. Home-based childcare provider reported vs. observed mealtime strategy utilization for (n = 24) children. Total observed PE behaviors in HBCC location = 300.



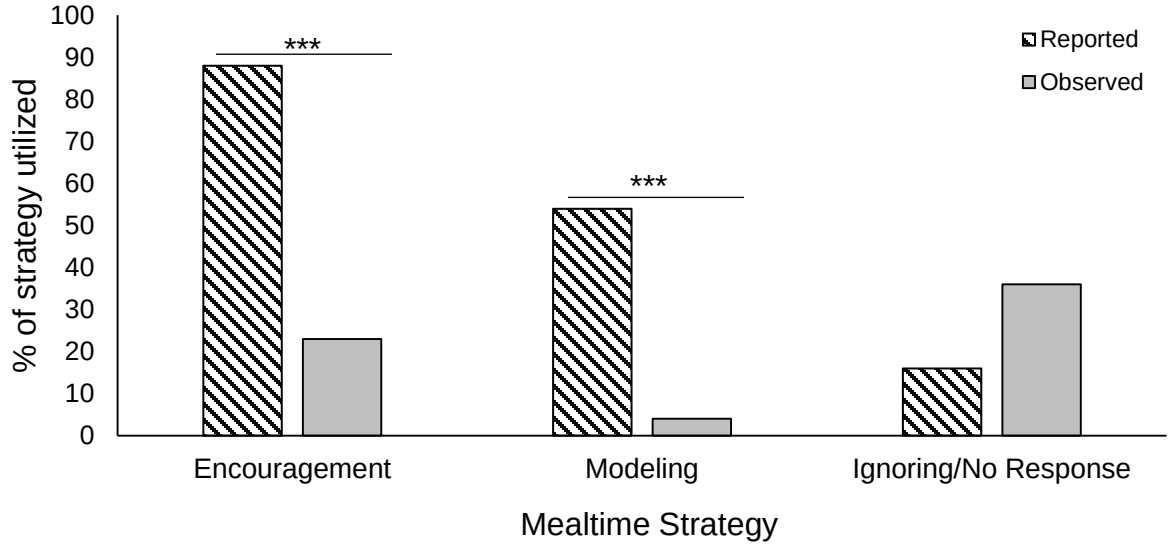
***p < 0.001. Home-based childcare providers reported utilizing encouragement and modeling significantly more than what was observed at mealtime. The opposite was true for ignoring/no response; HBCC providers were observed to ignore/not respond to child PE behavior significantly more than those who reported utilizing the strategy "always/often." Abbreviations: HBCC, home-based childcare; PE, picky eating.

Figure 6.7. Center-based childcare provider reported vs. observed mealtime strategy utilization for (n = 26) children. Total observed PE behaviors in CBCC location = 78.



***p < 0.001. Center-based childcare providers reported utilizing encouragement and modeling significantly more than what was observed at mealtime. The opposite was true for ignoring/no response; CBCC providers were observed to ignore/not respond to child PE behavior significantly more than those who reported utilizing the strategy "always/often." Abbreviations: CBCC, center-based childcare; PE, picky eating.

Figure 6.8. Center-based childcare parents reported vs. observed mealtime strategy utilization for (n = 26) children. Total observed PE behaviors in CBCC home location = 322.



***$p < 0.001$. Center-based childcare parents reported utilizing encouragement and modeling significantly more than what was observed at mealtime. No significant difference was observed between reported and observed ignoring/no response strategy utilization. Abbreviations: CBCC, center-based childcare; PE, picky eating.

CHAPTER 7
Summary and Future Directions

7.1 Summary

Prior to this study it was known that caregivers and the mealtime environment are influential to the development of children's eating habits and food preferences. However, most of the literature focuses on parents in the home environment, even though millions of children are cared for in non-parental childcare settings. Even less literature focuses on differences between types of childcare, such as center-based childcare (CBCC) and home-based childcare (HBCC). Before this research, no previous studies had investigated, via both survey and observations, the impact that the mealtime environment between the child's home and childcare and differences in caregiver feeding strategies between the child's parent and childcare provider had on the child's mealtime behavior, specifically picky eating behaviors.

In order to achieve our goal of characterizing the influence of the mealtime environment and caregiver feeding strategies on picky eating behaviors in children the first research question of interest was whether there were differences in utilized mealtime strategies between parents and childcare providers. The child's parent and childcare provider completed the Parent or Teacher Mealtime Strategies Survey regarding how often each caregiver typically used each mealtime strategy. We found that overall, parents and childcare providers utilize different strategies at mealtime, especially CBCC parents and providers. In addition, there are differences in how CBCC providers and HBCC providers use mealtime strategies. Unexpectedly, we also found differences in utilized mealtime strategies between parents who elect to send their child to CBCC versus those who send their child to HBCC.

Results from our first research question led to another question: could caregiver perception and agreement of child pickiness be influencing how caregivers are utilizing mealtime

strategies? To answer this question parents and childcare providers completed the Mealtime Assessment Survey (MAS) that assessed the child's typical mealtime behavior and PMS/TMS. Results from this study showed that parents were more likely than childcare providers to perceive a child as being picky and to be influenced by the child's pickiness in regards to the mealtime strategies they utilized. Additionally, we found that HBCC parents and providers agree more in their perception of child pickiness and are more likely to perceive a child as being picky than CBCC parents and providers.

The finding that differences exist in pickiness perception and mealtime strategy utilization between parents and childcare providers who care for the same child created another research question: are children behaving differently at mealtime between their home and childcare location even when the food is the same? Additionally, do caregivers accurately report child mealtime behavior? For this study children were observed consuming lunch at home with their parents and at childcare with their childcare providers. The food in all locations was kept constant. In addition, parents and childcare providers completed the MAS to assess typical child mealtime behavior.

We found that children behave differently at mealtime between their home and childcare environment even when they were consuming the same food, a conclusion, to our knowledge, has never before been reached via scientific study. Overall, we found that children were observed to be pickier eaters at home. Significant correlations between reported and observed mealtime behaviors were found for some, but not all caregivers. This finding indicates accuracy between the behaviors a caregiver perceives the child as expressing, versus those the child were observed to express only for those caregivers with significant correlations.

Because one of the previous study conclusions was that children behave differently between their home and childcare environment, our attention focused on the caregivers to investigate what strategies they utilized in response to the child's picky eating behavior. We were also curious to compare the mealtime strategies we observed caregivers to utilize to those they reported utilizing. For this study we observed parents and childcare provider's response to every observed child picky eating behavior at mealtime. Additionally, parents and childcare providers completed the PMS/TMS. We found that parents were more likely than childcare providers to respond to a child's picky eating behavior, while childcare providers were much more likely to ignore or not respond. We also found that overall both parents and childcare providers reported using all strategies significantly more than we observed them using, with the exception of ignoring/no response.

Taking these results together it is clear that 1) there are differences in the mealtime environment and feeding strategies that caregivers utilize, not only between home and childcare, but also between CBCC and HBCC, and 2) these differences impact child picky eating behavior.

In regards to differences between home and childcare, parents reported and were observed to utilize more mealtime strategies than childcare providers. In addition, generally parents were more likely than childcare providers to perceive a child as being picky. This could be because overall children were found to be pickier at mealtime, even when controlling for the food.

In regards to differences between CBCC and HBCC, we found that both HBCC parents and providers reported utilizing significantly more mealtime strategies than CBCC parents and providers. Furthermore, HBCC parents and providers were more likely to perceive a child as being picky than CBCC parents and providers. These results could be due to the differences in

child mealtime behavior between CBCC and HBCC, because while children were found to be pickier at home overall, there was not as large of a difference in behavior between home and HBCC as there was for home and CBCC. Home-based childcare children were pickier at home for the popular meal but not the non-popular meal, while CBCC children were picker at home for both meals. The collective findings from this research add to the knowledge base regarding child mealtime behavior and caregiver feeding strategies and can serve as a basis for intervention programs that strive to aid caregivers across multiple feeding environments to raise healthy, independent eaters.

7.2 Future Directions

While this research was able to identify that differences exist between parent and childcare provider mealtime strategy utilization across the home and childcare setting, we were unable to explore whether these inconsistencies in mealtime messages have negative effects on child eating habits. Longitudinal studies that observe mealtime strategy utilization while investigating child eating habits across different time points in the child's life are needed to understand if inconsistencies result in poor eating habits.

In addition, this study did not focus on other factors within the home and childcare environments that could have affected mealtime behavior, such as peers or siblings present at the meal, if there were distractions such as the TV or other electronics, whether the caregivers sat with the children at the meal, etc. Valuable insight could be gained from further exploration into the differences in these mealtime environments and their subsequent impact on child eating behavior.

Moreover, while we were able to investigate how caregivers responded to child picky eating behavior, we were limited to a possible five strategies that caregivers could utilize due to the scope of this project. However, one of the strategies that was coded for was an "other" strategy and responses were recorded qualitatively. A future direction would be to examine these responses for possible trends and compare their utilization across multiple settings.

Furthermore, it would be beneficial if future studies could build upon the work done with this research and code for the child's reaction once the caregiver utilized a mealtime strategy to identify the strategy's effectiveness in real-time. A codebook for child reactions would have to be created in order to capture the behaviors of interest. These results would be especially helpful for an intervention on how to effectively manage picky eating behavior.

Lastly, an intervention study that observationally investigates effective mealtime strategies for parents and childcare providers is necessary. The child could be observed consuming a novel food with their parent on one occasion and observed consuming a similarly novel food with their childcare provider on a different occasion. To control for differences in behavior due to differences in food, the different types of food given with the parent versus the childcare provider could be randomized. Caregivers would be instructed to utilize specific strategies during the tasting and the child's reactions would be recorded. Caregivers would also be asked to respond via survey how often they utilize the strategies they were instructed to use. This, along with the other future directions, would help to achieve the long term goal of aiding caregivers in raising healthy, independent eaters.

CHAPTER 8
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APPENDIX A
Example of Parent Mealtime Strategies Survey

Parents Mealtime Strategies Survey

Instructions: Do you use any of the following strategies to get your child/children to eat at mealtime? Please indicate how often you use each strategy.

Strategy	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
Offer your child a favorite food, snack or sweet/dessert as a reward for eating.					
Offer your child a non-food reward for eating food served at a meal					
Withhold a favorite food, snack or sweet/dessert as a consequence for not eating.					
Involve your child in planning and preparing the meal.					
Make your child finish all of the meal before getting dessert.					
Make a different food for your child before the meal if they don't like what is being served.					
Make a different food for your child after the meal if they didn't eat the food that was served.					
Serve a combination of foods that are new and/or disliked with foods already preferred by your child.					
Arrange the food in an interesting way to make the meal fun.					
Teach your child about the food served at the meal.					
Require your child to try a bite of each food on their plate.					

Show disapproval if your child does not eat.					
Strategy	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
Allow your child to choose the foods they want to eat from the food that is served.					
Praise your child about their food intake or feeding skills.					
Tell your child they cannot leave the table until a food is eaten.					
Spoon-feed your child to get them to eat.					
Ignore your child's fussiness when they are being picky about the food served					
Encourage your child to try new foods.					
Allow your child to eat what and how much they want at the majority of meals.					
Make the meal into a game to encourage eating.					
Model to your child that Mom and/or Dad are eating the food so they should eat the food too.					
I do not need to use any strategies to get my child to eat at mealtime.					

Thank you for taking our survey! Once completed, please return all surveys to the CDL. If you have any questions please contact graduate researcher Virginia Luchini at picky.eating.study@gmail.com.

APPENDIX B
Example of Teacher Mealtime Strategy Survey

Teacher Mealtime Strategies Survey

Instructions: Do you use any of the following strategies to get your students to eat at mealtime? Please indicate how often you use each strategy.

Strategy	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
Arrange the food in an interesting way to make the meal fun.					
Teach your student about the food served at the meal.					
Require your student to try a bite of each food on their plate.					
Show disapproval if your student does not eat.					
Allow your student to choose the foods they want to eat from the food that is served.					
Praise your student about their food intake or feeding skills.					
Tell your student they cannot leave the table until a food is eaten.					
Tell your student that the food tastes good.					
Spoon-feed your student to get them to eat.					
Encourage your student to try new foods.					

Allow your student to eat what and how much they want at the majority of meals.					
Make the meal into a game to encourage eating.					
Strategy	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
Model to your student that their teacher is eating the food so they should eat the food too.					
Ignore your student's fussiness when they are being picky about the food served					
Tell the child they have to try a bite of everything before getting seconds.					
Withhold something as a consequence for not eating.					
Offer the child a reward for eating					
I do not need to use any strategies to get my student to eat at mealtime.					

Thank you for taking our survey! Once completed, please return all surveys to the CDL. If you have any questions please contact graduate researcher Virginia Luchini at picky.eating.study@gmail.com.

APPENDIX C
Example of Mealtime Assessment Survey

Mealtime Assessment Survey

Instructions: Please respond to the statements below by checking how often each of the statements describes ***your child's behavior regarding family mealtimes.***

How often does your child…	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**	**Not Applicable**
Put up a fight or refuse to come to the table when it is time for a meal (or snack)						
Show signs of fear, nervousness, or strong anxiety before mealtime (or snack)						
Look forward to eating and mealtime (or snack)						
Cringe or make a negative face after seeing or eating certain foods						
Cry or get upset after seeing or eating certain foods						
Gag or has a physical reaction after seeing or eating certain foods (NOT related to food allergies)						
Become disengaged/uninvolved while sitting at the table during mealtime (or snack)						

Carefully inspect the majority of food before taking a bit (is suspicious of food)						
Have something better to do than eating at mealtime (or snack)						
Show signs of sadness or disappointment when food is not prepared/cooked in the "right way"						
Eat foods in sequence during the main course (ex: all peas first, then all potatoes, etc)						
Take a long time to finish a meal compared to everybody else						
Finish all the food served on the plate						
Refuse to open mouth when do not want to eat certain foods						
Prefer to drink liquids instead of eat the food at mealtime (or snack)						
Try new foods						
Eat the same foods repeatedly						

Eat from a narrow range of food (fewer than 10 different foods)						
Eat foods from only one food group (ex: eats only from meat group, grains group, etc)						
How often does your child…	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**	**Not Applicable**
Eat foods that are considered “healthy”						
Eat foods with something in them that cannot be seen (ex: filled foods like ravioli)						
Eat foods that have touched each other on the plate						
Eat foods that are mixed or that have complex ingredients (ex: casseroles, lasagna)						
Eat foods with sauces on them (ex: pasta with tomato sauce, turkey with gravy)						
Eat raw fruits and vegetables (NOT baked, steamed, etc.)						
Eat foods that are “lumpy” (ex: sauce with pieces in it or stew)						

Eat foods that are slippery or “slimy”						
Eat foods that are hard, dry or crunchy						
Eat foods that are smooth or pureed food with no detectable particles						
How often does your child…	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**	**Not Applicable**
Eat foods of only one particular color						
Comment that food was not prepared or cooked right						
Request to eat different food than what was served						
Participate in mealtime conversation						
How often is your child a picky eater?						

Thank you for taking our survey! Once completed, please return all surveys to the CDL. If you have any questions please contact graduate researcher Virginia Luchini at picky.eating.study@gmail.com.

APPENDIX D
Participant Demographic Information Survey

Demographic Information:
Please make an "x" or a check to denote your answer

Q1. Please tell us your gender.

Male	
Female	
I prefer not to say	

Q2. Which of the following best describes your age?

Under 18 years old	
18-25	
26-35	
36-45	
46-55	
56-65	
66 and over	
I prefer not to say	

Q3. What is your marital status?

Single	
Married	
I prefer not to say	

Q4. How do you describe yourself? (Mixed race heritage should check all that apply)

American Indian or Alaska Native	
Asian	
Black or African American	
Caucasian	
Hispanic or Latino	
Native Hawaiian or Other Pacific Islander	
There is no applicable answer	
I prefer not to say	

Q5. How many children do you have? ☐

Q6. List ages of children (separate with commas).

☐

Q7. What is your highest level of education?

Some high school	
High school graduate	
Technical school	
Some college	
Bachelors degree (4 year college)	
Post graduate degree (Masters or Doctorate)	
I prefer not to say	

Q8. Are you a faculty, student, or staff of the University of Illinois? If yes, which group do you belong to?

Faculty	
Student	
Staff	
No, I am not related to the University of Illinois	

Q9. Which of the following best describes your household's total yearly income before taxes?

Under $25,000	
$25,000 - $34,999	
$35,000 – $49,999	
$50,000 - $74,999	
$75,000 - $99,999	
$100,000 and over	
I prefer not to say	

APPENDIX E

INFORMED CONSENT AND PARENT PERMISSION FORM

"Mealtime Strategies for Picky Eating Behaviors Study"

Date: Spring 2013

Dear Parent:

You are invited to participate in a study regarding mealtime strategies for picky eating behaviors in children ages 3-5 years old. This research project aims to compare the different mealtime strategies used by caregivers and to identify mealtime strategies that would effectively work across different settings. The goal is to support the development of healthy eating habits in children through cooperative and systematic mealtime approaches adopted by different caregivers (parents and caregivers at daycare). This study is conducted by Dr. Soo-Yeun Lee and Dr. Sharon Donovan of the Department of Food Science and Human Nutrition with assistance from graduate researcher Virginia Luchini, all from the University of Illinois Urbana Champaign.

As a part of the study, one parent from each family will complete a set of surveys regarding their child's mealtime behaviors, parent feeding style, parenting style, and parent mealtime strategies. Classroom teachers will also complete a teacher mealtime strategies survey and a mealtime behavior survey about each child in the study. Additionally, each child in the study will be observed twice in their normal lunchtime environment at the Child Development Laboratory during two mealtimes. Each observation will last for 15 minutes and there will be no alterations in the child's normal lunch routine. In order to document the mealtimes, observations will be conducted with video cameras. All collected data will kept confidential by researchers and stored securely in accordance with the University of Illinois's research guidelines. There are no risks to you and your child beyond those of everyday life and the daily practices at the Child Development Laboratory. As well as being filmed during lunchtime, we are asking that you allow us to film two of your family's lunchtime meals at home. This means that you will be giving consent that your family (spouse, children, etc.) can be in the video. We will be providing lunch for meals we will be recording. Meals for family weekend lunch recordings will be picked up at the CDL on the Friday before your scheduled weekend lunchtime observation (we will let you know when your scheduled observations are after we have your signed consent form). When your family is ready on the day of the mealtime observation recording researchers will set up the camcorder in your home before lunch begins and retrieve it once the meal has been completed. This will happen twice (preferably two weekends in a row) so that we have two mealtime observations. However, if the meal that was recorded was very atypical we may have to film a different time in order to capture a more typical meal.

The parent surveys include the Mealtime Assessment Survey (MAS), the Parent Mealtime Strategies (PMS), the Parenting Dimensions (PSDQ), and the Parent Feeding Styles and Practices Survey (PFSPS). The MAS will take approximately 20 minutes of your time. You will be shown a series of 50 child mealtime behaviors and 25 parental mealtime strategies and asked to rate on a scale (Never, Once in a while, About half the time, Very often, Always) how often you or your child exhibit these behaviors/strategies. The PMS will take approximately 10 minutes and you will be given a series of 25 mealtime strategies parents may exhibit when interacting with their child during mealtime. You will then rate on the same scale how often you exhibit this behavior with your child. The PDSQ will take about 10 minutes and ask about your style of parenting. The PFSPS will take approximately 20 minutes of your time. You will be shown a list of 33 questions that ask about your feeding style and feeding practices. By completing these four surveys and by allowing us to film two of your family lunch mealtimes, you will receive $99 for your time.

Your decision to participate or decline participation in this study is completely voluntary and you have the right to terminate your participation at any time without penalty. Similarly, researchers reserve the right to terminate participation of an individual subject at any time.

Your decision to participate, decline, or withdraw from participation will have no effect on your current status or future relations with the University of Illinois or the Child Development Laboratory. Your child's participation in this project is completely voluntary. In addition to your permission, your child will also be asked if he or she would like to take part in this project. Only those children who have parental permission and who want to participate will do so, and any child may stop taking part at any time. You are free to withdraw your permission for your child's participation at any time and for any reason without penalty. These decisions will have no affect on your future relationship with the Child Development Laboratory, your child's status there or become part of your child's school record. You and your child's participation in this research will be completely confidential. However, as researchers we are also considered mandated reporters. Although it is very unlikely, the researcher is required to report any incident that he/she witnesses where someone is in danger, such as abuse or neglect.

Your name and contact information will be kept secure and only accessed by the CDL and trained researchers working on this project. Participants' personal information will NOT be released in any way. The results of all data collection will be averaged and reported in aggregate. Possible outlets of dissemination may be a thesis paper, journal article and possible conference presentation. Individual participant names and information will NOT be shared. Although your participation in this research may not benefit you personally, it will help us understand the mealtime strategies that effectively manage picky eating in children so we can assist parents in overcoming picky eating difficulties.
If you have any questions about this project, please contact us using the information at the end of this consent form. If you have any questions about your rights as a participant in research involving human subjects, please feel free to contact the University of Illinois Institutional Review Board (IRB) Office at 217.333.2670 or irb@uiuc.edu. You are welcome to call these numbers collect if you identify yourself as a research participant.

Please keep the attached copy of this letter for your records.

Sincerely,

Virginia Luchini
217-333-6554
picky.eating.project@gmail.com

Dr. Soo-Yeun Lee
217-244-9435
soolee@illinois.edu

Please check here if you consent:

____ I have read and understand the above consent form, I certify that I am 18 years or older, and I indicate my willingness to voluntarily take part in the study. I also give permission for my child _____ to participate in the research project described above.

By signing below, I certify that I am at least 18 years in age and I understand the information and voluntarily consent to participate in the study described above. I have been given a copy of this consent form.

Signature _____ Date _____

Printed Name _____

APPENDIX F

INFORMED CONSENT FOR TEACHERS
"Mealtime Strategies for Picky Eating Behaviors Study"

Date: Spring 2013

You are invited to participate in a study regarding mealtime behaviors in children ages 3-5 years old. This research project aims to compare the different mealtime strategies used by caregivers and to identify mealtime strategies that would effectively work across different settings. The goal is to support the development of healthy eating habits in children through cooperative and systematic mealtime approaches adopted by different caregivers (parents and caregivers at daycare). This study is conducted by Dr. Soo-Yeun Lee and Dr. Sharon Donovan of the Department of Food Science and Human Nutrition with assistance from graduate researcher Virginia Luchini, all from the University of Illinois Urbana Champaign.

As a part of the study, one parent from each family will complete a set of surveys regarding their child's mealtime behaviors, parenting styles, parent feeding style and parent mealtime strategies. Teachers will complete two surveys: one about the child's mealtime behaviors while at school and one about teacher mealtime strategies. Additionally, each child in the study will be observed in their normal lunchtime environment in the home-based childcare center where you work during two mealtimes (we will provide you with lunch during observation days). Each observation will last for 15 minutes and there will be no alterations in the child's normal lunch routine. In order to document the mealtimes, observations will be conducted with video cameras. Since we are collecting data about caregiver mealtime strategies, as a teacher (and therefore caregiver) you will also be recorded. All collected data will kept confidential by researchers and stored securely in accordance with the University of Illinois's research guidelines. For completing both observations you will receive $79 for your time.

One survey you will complete is called the Teacher Mealtime Strategies (TMS) survey and will take approximately 20 minutes of your time. You will be shown a series of 19 mealtime strategies that you may use at mealtime with your students. Please rate on a scale how often you use each strategy (Never, Rarely, Sometimes, Often, Always). You will also be asked to complete a Mealtime Assessment Survey (MAS) that asks about a child's mealtime behavior. This survey should only take 15 minutes of your time. You will use a very similar scale as the TMS to describe how often a child exhibits a certain behavior. Please complete one of each of the surveys for each child that is in the study. For completing these surveys you will be compensated $20 per child.

Your decision to participate or decline participation in this study is completely voluntary and you have the right to terminate your participation at any time without penalty. Your decision to participate, decline, or withdraw from participation will have no effect on your current status or future relations with the University of Illinois or the home-based childcare center where you are currently employed.

Your participation in this research will be completely confidential. However, as researchers we are also considered mandated reporters. Although it is very unlikely, the researcher is required to report any incident that he/she witnesses where someone is in danger, such as abuse or neglect.

Your name and contact information will be kept secure and only accessed by project researchers and home-based childcare staff (if any). Participants' personal information and the videos will NOT be released in any way. The results of all data collection will be averaged and reported in aggregate. Possible outlets of dissemination may be

a thesis paper, journal article and possible conference presentation. Results may also be shared internally with the sponsoring agency, but individual participant names and information will NOT be shared. Although your

participation in this research may not benefit you personally, it will help us understand the influences that lead to picky eating in children so we can assist caregivers in overcoming picky eating difficulties.

There are no risks to individuals participating in this survey beyond those that exist in daily life.

If you have any questions about this project, please contact us using the information at the end of this consent form. If you have any questions about your rights as a participant in research involving human subjects, please feel free to contact the University of Illinois Institutional Review Board (IRB) Office at 217.333.2670 or irb@uiuc.edu. You are welcome to call collect if you identify yourself as a research participant.

Please keep the attached copy of this letter for your records.

Sincerely,

Virginia Luchini
217-333-6554
picky.eating.study@gmail.com

Dr. Soo-Yeun Lee
217-244-9435
soolee@illinois.edu

Please check here if you consent:

____ I have read and understand the above consent form, I certify that I am 18 years or older, and I indicate my willingness to voluntarily take part in the study and complete the teacher surveys.

____ I agree to have my classroom observed and grant permission for researchers to capture me in the video footage with the understanding that the videos will not be disseminated.

By signing below, I certify that I am at least 18 years in age and I understand the information and voluntarily consent to participate in the study described above. I have been given a copy of this consent form.

Signature Date

Printed Name

APPENDIX G
Consent to Utilize Videos in Presentations – HBCC Parents

Video/Photo/Audio Consent Form – Home-based Daycare Parents

I, the undersigned, do hereby consent to the use by the University of Illinois at Urbana-Champaign of the image and/or voice of the persons, including my child, myself, and any other family members in the home family mealtime videos and the videos collected at my child's home-based daycare as part of participating in The Picky Eating Project. I understand that I am only consenting for myself and family members and am not responsible for the consent for any other people seen in the video.

I warrant that I understand that the videos can be used in educational presentations for dissemination of scientific results and that all identifiable information will be kept strictly confidential.

I understand that if I change my mind and no longer want the videos to be able to be used for dissemination purposes that I may contact the Project Investigators and revoke my consent.

I warrant that I am at least 18 years of age and that I am competent in my own name insofar as this consent is concerned. I further attest that I have read this consent form and fully understand its contents.

_____

Signature of parent or legal guardian:

_____

Printed name of parent or legal guardian:

_____

Address of parent or legal guardian:

_____

Date:

_____

Project Investigators:

Dr. Soo-Yeun Lee
905 S. Goodwin Ave.
351 Bevier Hall MC-182
Urbana, IL 61801
Phone: 217-244-9435
Fax: 217-265-0925
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Dr. Sharon Donovan
905 S. Goodwin Ave.
339 Bevier Hall
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Phone: 217-333-2289
Fax: 217-333-9368
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Virginia Luchini
905 S. Goodwin
486A Bevier Hall
Urbana, IL 61801
Phone: 217-333-6554
Email: luchini1@illinois.edu

APPENDIX H
Consent to Utilize Videos in Presentations – HBCC Providers

Video/Photo/Audio Consent Form – Home-Based Daycare Teachers

I, the undersigned, do hereby consent to the use by the University of Illinois at Urbana-Champaign of the image and/or voice of myself in the videos collected as part of participating in The Picky Eating Project. I understand that I am only consenting for myself; any child in the video will receive consent from their parents.

I warrant that I understand that the videos can be used in educational presentations for dissemination of scientific results and that all identifiable information will be kept strictly confidential.

I understand that if I change my mind and no longer want the videos to be able to be used for dissemination purposes that I may contact the Project Investigators and revoke my consent.

I warrant that I am at least 18 years of age and that I am competent in my own name insofar as this consent is concerned. I further attest that I have read this consent form and fully understand its contents.

_____

Signature of home-based daycare provider:

_____

Printed name of home-based daycare provider:

_____

Address of home-based daycare provider:

_____

Date:

_____

Project Investigators:

Dr. Soo-Yeun Lee
905 S. Goodwin Ave.
351 Bevier Hall MC-182
Urbana, IL 61801
Phone: 217-244-9435
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Dr. Sharon Donovan
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Email: sdonovan@illinois.edu

Virginia Luchini
905 S. Goodwin
486A Bevier Hall
Urbana, IL 61801
Phone: 217-333-6554
Email: luchini1@illinois.edu

APPENDIX I
Consent to Utilize Videos in Presentations – CBCC Parents

Video/Photo/Audio Consent Form – CDL Parents

I, the undersigned, do hereby consent to the use by the University of Illinois at Urbana-Champaign of the image and/or voice of the persons, including my child, myself, and any other family members in the videos collected as part of participating in The Picky Eating Project.

I warrant that I understand that the videos can be used in educational presentations for dissemination of scientific results and that all identifiable information will be kept strictly confidential.

I understand that if I change my mind and no longer want the videos to be able to be used for dissemination purposes that I may contact the Project Investigators and revoke my consent.

I warrant that I am at least 18 years of age and that I am competent in my own name insofar as this consent is concerned. I further attest that I have read this consent form and fully understand its contents.

_____

Signature of parent or legal guardian:

_____

Printed name of parent or legal guardian:

_____

Address of parent or legal guardian:

_____

Date:

_____

Project Investigators:

Dr. Soo-Yeun Lee
905 S. Goodwin Ave.
351 Bevier Hall MC-182
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Virginia Luchini
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Phone: 217-333-6554
Email: luchini1@illinois.edu

APPENDIX J
Child Mealtime Observations Codebook

Refusals vs. Avoidances	
Definition of Refusal	**Definition of Avoidance**
Aggressive Direct Obvious, clear indication of dislike or disapproval	Passive Coy, "sneaky", or creative acts in order to not consume food No direct indication of dislike or disapproval seen, but the child still does not consume the food
*End Result of Both Refusals and Avoidances Is The Same – Child does **NOT** Consume Food*	
Verbal Examples of Refusals	**Verbal Examples of Avoidances**
- "I don't want the grapes" - "I don't like the salsa" - *Teacher:* "Do you want broccoli" *Child:* "No" - Verbally cries or whines in protest when sees food or is asked to consume food	- "Can I have something else?" - "Can I eat more of my sandwich instead of grapes?"
Physical Examples of Refusals	**Physical Examples of Avoidances**
Child… Spits out food Pushes food away Covers mouth so food will not be placed in mouth Shakes head "no" Makes a negative face (scrunches noes, sticks out tongue)- separate from crying	Child… Takes sandwich apart and eats only the cheese (avoids the turkey and bread) Licks ranch off broccoli, avoiding the broccoli
If, at end of the meal, a child does not consume or even try a bite of a certain food then "Child Did Not Consume [insert food item]"is coded at the end.	

Do NOT code for:	
Code	**Explanation**
Neutral comments about food	Neutral comments about food such as "the broccoli is prickly!" cannot be placed into the refusal or avoidance category because they are statements unrelated to the preference or intention of consumption of the food. DO NOT FORCE STATEMENTS/ACTIONS MADE BY CHILD INTO CODES. If the statement or action doesn't seem like it fits into either refusal or avoidance, it probably shouldn't be coded!
Comments about satiety	Comments such as "I'm not hungry" or "my tummy is full" should not be coded as a refusal or avoidance because our goal is NOT to force children to eat. If a child says they are satisfied and do not want any more food, even if they didn't eat much and probably just don't want to eat the food offered, we should take their word for it.
Comments made about foods outside those included in NPE or PE meal **after initial inquiry**	Comments made after initial inquires for food outside NPE or PE meal should not be coded for. For example, if the child asks for noodles, their initial inquiry is coded for as an avoidance, but comments made about the noodles after their initial inquiry should not. For example: *Child: I want noodles instead of the sandwich.* *Mother: Ok, I'll make you some.* *Child: I don't like these noodles.* The first statement from the child would be coded as avoidance, the second statement from the child would not be coded for.

APPENDIX K
Caregiver Feeding Strategies and Mealtime Components Codebook

Data Collection – Picky Eating Project
Fall 2014

Components of mealtime environment

1. **Number of adults at meal.**

Those who appear to be over 18 years of age, determined by tasks and responsibilities during mealtime (e.g. serving food to others), physical attributions (body status, height etc.) and maturity (i.e. does not engage in child-like behavior) as well as whether they are treated as adult by others individuals present at the meal.

Only include individuals that can be seen on camera. In the case that you suspect that there may be more adults present at the meal, but they are not visible or they aren't present for most of the meal (over 50%), write the number you see and in parenthesis write the number of total individuals you suspect their might be.

Example: You see two adults on camera but you hear two other distinctly different voices and believe two other people are present at the meal. Or you see that the mother is always sitting down at the table but the dad is only there for a little bit. In these cases you would write:

2(4) ← Total number of adults suspected to be present of meal.

↑

Total number of adults seen on camera.

2. **Number of children at meal.**

Children are those who appear to be under 18 years of age based on physical attributions, age appropriate tasks and responsibilities at meal (e.g. setting the table) and whether or not they engage in child like behavior or if they are treated as a child by others present at the meal. **Mark down the maximum number of children you see.**

3. **How is meal served?**
    - **Parent/Daycare provider only:** Adult(s) serve food to those present at meal, especially to children. Adult determines portion size and food choice.
    - **Family style:** Food is served buffet style and everyone at meal serves himself or herself including children. Individuals determine portion size and food choice.
    - **Child Directed:** An adult still serves the child their food, but the child is an active participant in food choice and directs what and/or how much is to be on their plate.

- **UTD:** (Unable to determine) When it is unclear who determined portion size or food choice (e.g. food is already on plates at the beginning of meal.

4. **Is electronic media (TV, iPad/iPhone, portable DVD player, radio etc.) being used that can be seen in the frame?**
   - Electronic media is visible on camera.
   - The family/children/daycare provider is obviously distracted by the electronic device (ex- watching TV during the meal or on their iPhone during the meal)

   Is electronic media being used (in an adjoining room or the same room as the meal), but the participants are not paying attention to it?
   - Ex- TV/computer is audible but not distracting the participants from the meal
   - The family/children/daycare provider is not paying attention to the TV or electronic device, but it is on.

5. **Does the child get distracted with toys at mealtime that you can see within the frame?**
   - Toys can be stuffed animals, books, leggos, etc.
   - The child stops paying attention to the meal and focuses on the toy.

6. **Does the caregiver offer or give food to the child that was not included in the meal we provided?**
   - Non-popular meal: turkey and cheese sandwich on whole wheat bread, broccoli, ranch, grapes
   - Popular meal: grilled chicken strips, tortilla chips, salsa, banana
   - For example, the caregiver says "Do you want some pasta?"

7. **Does the family or care provider discuss food / nutrition at meal?**
   Characteristics of a "Yes" Answer:
   - Adult or child discusses a food and its nutritious value.
   - Adult or child discusses health behaviors.
   - Adult or child discusses food preparation.
   - Circle yes when the family engages in a conversation about food or nutrition. Do not record instances in which an adult or child simply comments on a food.
   - Circle yes even if the information discussed is incorrect information.

   Characteristics of a "No" Answer:
   - Adult or child mentions a food or nutrition, but the family does not acknowledge the comment.
   - Adult of child talk about other topics unrelated to nutrition (ex- how school was yesterday, the day's activities, etc.)

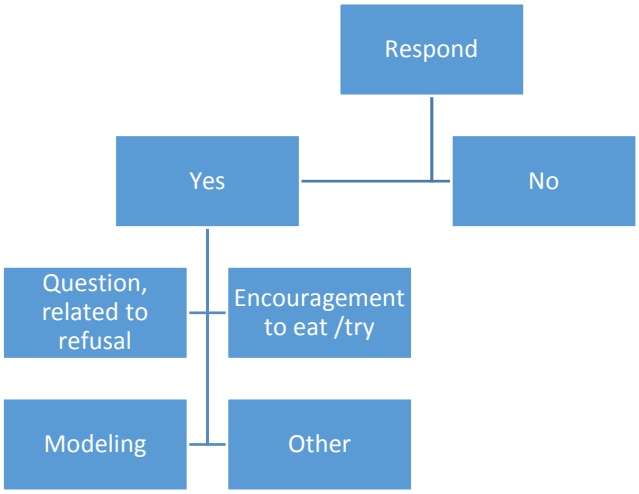
8. **Does the caregiver ask the child to finish the food on their plate at least once? If so, does the child actually finish the food on their plate? How many times did the caregiver have to ask them for them to finish the food on their plate?**
   - Acceptable quotes – quotes that tell the child to eat regardless of whether they are hungry or not:
     i. "Finish your food"
     ii. "Finish the food on your plate"
     iii. "Finish your plate"

iv. "Clean your plate"

- Unacceptable quotes – direct commands:
  i. "Finish eating"
  ii. "Eat your food"
- If, by the end of the meal the child finishes their plate please mark down that they have done so and how many times the caregiver had to ask them to eat everything

Sequential Analysis

After the refusal/avoidance, did the caregiver:



Response Type:

- *Question:* The caregiver poses a question to the child to get more information in regards to the child's refusal or avoidance:
  - "You don't like salsa?"
  - "Why don't you want to try it?"
- *Encouragement to eat/try*: The caregiver tries to get the child to try or eat the food
  - "Try just one bite"
  - "It's good, you should try it!"
- *Modeling*: The caregiver deliberately eats the refused/avoided food or talks about their preference for the food
  - "I like the broccoli"
  - "Dad likes the salsa"
- *Other*: The caregiver responds, but with something other than the options listed
  - Please write the other response down

APPENDIX L
Record of Qualitative Caregiver Feeding Responses Coded as "Other"

Picky Eating Project: Sequential Analysis

Name of Video: _____

Time: _____

Caregiver's "other" Reaction:

_____

_____

_____

Name of Video: _____

Time: _____

Caregiver's "other" Reaction:

_____

_____

_____

Name of Video: _____

Time: _____

Caregiver's "other" Reaction:

_____

_____

_____

APPENDIX M
Home Observation Protocol

Picky Eating Project Home Visits
Undergraduate Student Protocol

1. Arrive at the Picky Eating Project office, Room 486A Bevier Hall.
2. Pick up folder with you and your partner's name on it. Make sure it has directions to the family's house and the time of their lunch.
3. Find the video camera you have been assigned to, number _____.
4. Do a test of the video camera to make sure it is operating correctly, including sound!
    a. If the camera is not operating correctly, find the camera handbook and try troubleshooting. If that doesn't work, contact Virginia at 630-310-6744 if she is not at the office.
    b. If the camera is not charged please charge it until it is at least half-way charged. Make sure the charger is in the bag.
5. Attach the video camera to the tripod, tripod number _____.
6. Collect the appropriate number of lunch boxes you will need to deliver to the families. For this observation you will be delivering _____ boxes of the _____ meal.
7. Once you know that the camera is working, where you are going, at what time you have to be there, have the lunches and all equipment, and both you can your partner are present, drive to the participant's home.
8. Upon arrival, greet the family. If you have not met them before, introduce yourself. Then, take off your shoes and ask where to put personal belongings.
9. Get verbal confirmation that it is okay to set up the video camera in the kitchen by saying something like "do you mind if we set up the video camera in the kitchen?"
10. The junior team member will set up the video camera in the participant's home, making sure the camera is focused on the main eating space while the senior team member is talking with the family.
    a. **IMPORTANT!** When the camera is set the junior team member should start the camera and hold up the Participant Info Sheet in front of the lens. Make sure to plug in camera if low on battery.
11. Once the camera is set, leave with your partner while the family eats. Make sure to fully leave, do not sit in the car in their driveway or on the street in front of the house.
12. Come back in after the family is finished eating (Virginia will call you to let you know when they are done).
13. While the senior team member asks the parents fill out a post-observation survey the junior team member should be taking down and putting away the equipment.
14. Thank the family for their time and drive back to the Picky Eating Project office.
15. Once at the office, debrief with partner and Virginia:
    a. The point of this activity is to ensure that both researchers are comfortable with the experience and are able to address any concerns about the visit.

b. If child abuse is suspected the researchers should fill out an incident report form.

16. Put camera in desk drawer and other equipment back on the desk. If the camera is low on battery please plug it in.
17. Fill out mileage reimbursement form and put it in the file labeled “COMPLETED MILEAGE REIMBURSEMENT FORMS”
18. Make sure to turn in all collected documents to the “completed home visit paperwork” file, including the receipt that the family has received the money (if this was the last observation) and the post-meal survey.

APPENDIX N
Assessment of Meal Normality

Participant ID number: _____ *Date of In-Home Visit:_____*

Post-Observation Survey:

1. How typical was your child's behavior at this family lunch meal?

Severely atypical Moderately atypical Fairly Typical Very Typical

Severely atypical = behavior was very strange, he/she has never acted like this before
Moderately atypical = behavior was somewhat unusual, but he/she has acted like this a couple times before
Fairly typical = behavior was normal, only a few things "out of the ordinary"
Very typical = this is how he/she always acts

2. If severely or moderately atypical, why?